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In This Issue—*Electrical Shop Profits*

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MOTOR AGE

Volume XLII
Number 22

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CHICAGO, NOVEMBER 30, 1922

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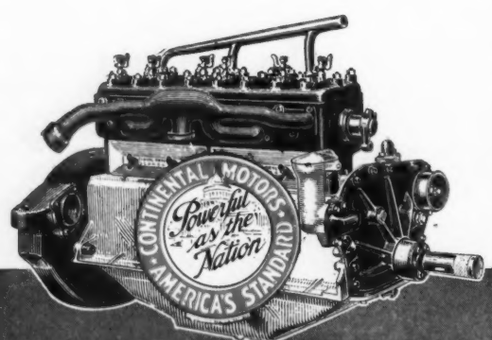
As you know, upon the crankcase of the motor of every SPECIALIZED Vehicle is the Continental Red Seal.



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MOTOR AGE

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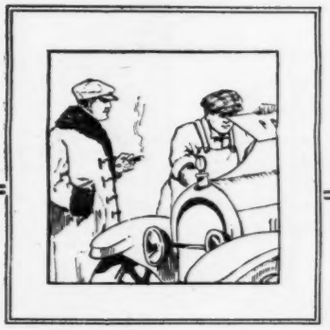


You Can't Build Business on Excuses

A motorist deprived of his car is like a lame man deprived of his crutch. He feels lost and helpless without it.

That is why delays annoy him so, when his car is laid up for repairs. And if you hold up the job because of trouble in matching a thread, no excuse is going to make him forget the inconvenience. There's no surer way of losing good business.

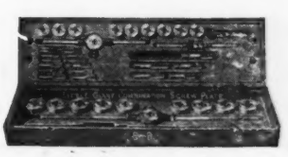
GTD would prevent that—for with a GTD screw plate assortment you are equipped to match any thread that blows into the shop.

GTD taps, dies and reamers are made for long, efficient service—and their capacity for hard work will give you a new conception of cutting-tool quality.

The GTD shop booklet describes them and tells you how to choose an assortment to meet the particular needs of your business. Write for a copy.

Demand **GTD** *Twist Drills for your drill press, electric or breast drill. Their ability to stand up under hard use is guaranteed by the* **GTD** *trademark.*

This **GTD** *Adjustable Reamer will replace a large number of solid reamers. Has a .042" range of adjustment.*



A *Little Giant* Combination U. S. S. and S. A. E. Standard thread Screw Plate. One of these sets is *absolutely necessary* in every shop which has a service department.

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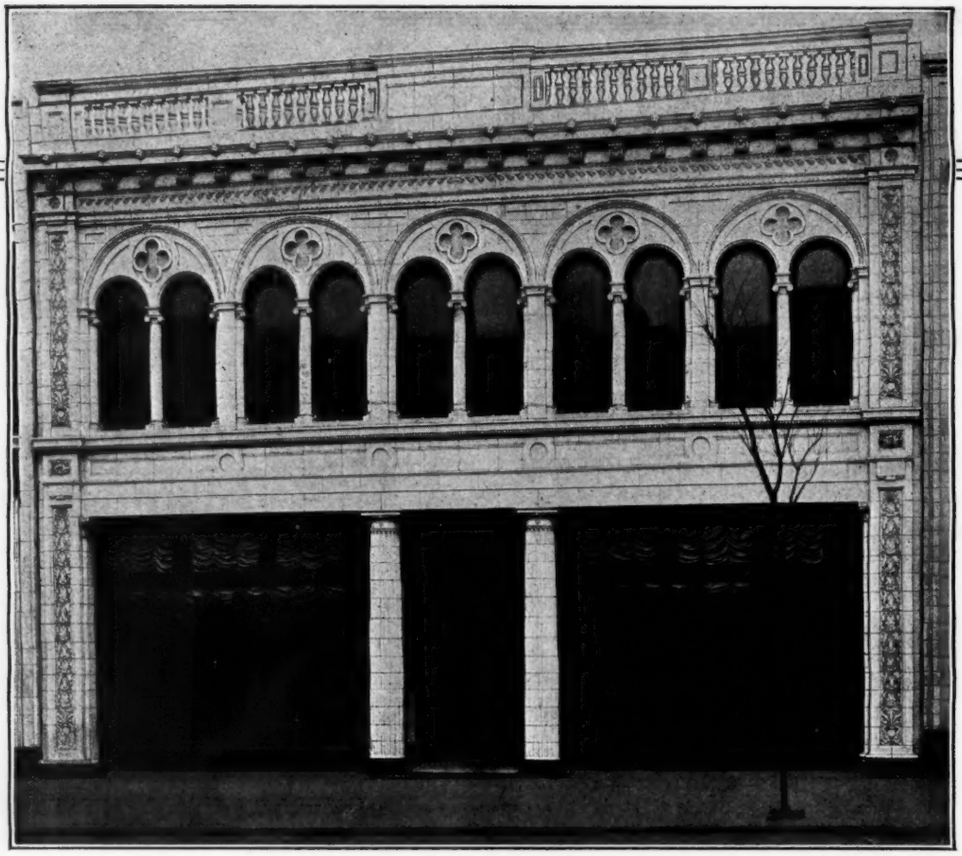
"The Well-Equipped Shop Gets the Business"



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THIRTEEN years to its credit—yet you can't find a spot on the sparkling white exterior of the Anderson Garage. It's as distinctive, clean and attractive as the day it was built.

Ten, twenty, thirty years from now it will still stand out from its grimy neighbors—and by its very brightness advertise itself to passers-by. For this building is faced entirely with white glazed Terra Cotta, and, this practical material can always be kept clean by occasional washings with soap and water. Oil, grease, dust and dirt cannot permanently mar it.

This ease of cleaning is only one of Terra Cotta's many advantages. It is weather-proof, oilproof, and fire-resistant to the utmost. There is no limit to its adaptability to form and color. It admits of simple or elaborate treatment at moderate cost, and permits the use of artistic color combinations impossible in any other material.

Let us tell you further why Terra Cotta is particularly well adapted to facing garages, service stations, and automotive buildings of all kinds. We may be able to give you information that will save you time and money when you decide to build or alter.

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TERRA COTTA

Permanent *Beautiful* *Profitable*

Vol. XLII, No. 22 Chicago, November 30, 1922 $3 Per Year

MOTOR AGE

This battery service station exemplifies the most modern methods in battery selling. The reception room at the right is finished outside to represent a bungalow, while inside, wicker furnishings give it a homelike appearance. Here the customer may be received, and the sale closed, away from the smell and confusion of the shop

22 Suggestions for Electrical Shop Profits

Concrete Ideas That Will Help the Technician Become a Better Business Man and Extend His Trade

By A. H. PACKER

THE principles that keep the electrical shop in business are the same, whether it is an impressive establishment in a large city or a small shop in a small town—the motive behind either is the desire to make money.

In this we do not mean that such a desire should take precedence, to the point where the methods of the fake oil stock promoter are employed. A service, however, should be rendered to humanity in general, and to car owners in particular—such that they will gladly, or at least amiably, part with the price. It is such a service that enables the shop to show a profit.

A survey of this business will reveal that the shops which are developing and returning a profit to their owners are those managed along business lines. The manager may know but little about the electrical detail of the business he conducts.

On the other hand, the man who has risen from the ranks to open a shop of his own, while perfectly capable as far as the actual work is concerned, is often unsuccess-

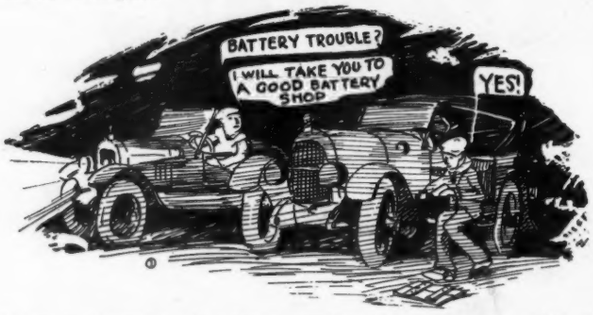
ful due to lack of business knowledge and an application of those principles that bring business to his doors and hold it after it gets there.

No. 1—Advertising and What it Means

You may have a better knowledge than any one else in the world, as far as the details of electrical repairing are concerned.

You may have the best equipment of any shop.

But unless you can convincingly tell your town and the surrounding country that this is so, you will wind up in the financial boneyard.



Many an inventor has been convinced in his own mind that he was possessed of some idea that would be a benefit to humanity, but if unable to convince others his time might better have been spent splitting wood.

By advertising we do not mean merely putting a notice of some kind on a billboard or in a newspaper, although these methods all help, but it includes any and all methods employed that bring to the attention of your fellows that you are up and doing and ready for action, and that you can deliver the goods. This idea you must get across to the other fellow. It is of no value in your own thought only.

If you have a big establishment, you will employ all of the well known methods of making people think about you. Newspapers, billboards, moving picture slides all help. Then there are other methods that can be used depending on the ingenuity of the man running the station. In smaller communities the papers are willing to print hints for motorists which can contain indirect but very effectual publicity.

For example, a short article on the effect of cold weather on the battery may be prepared by "Mr. Keen, President of the Startquick Battery & Electrical Co." Similar ideas will come to you if you get to thinking along these lines.

No. 2—Your Shop Front

Many a man wears an old hat or old suit until his wife tells him to buy a new one. In the same boat is the owner of a shop, who becomes so used to its run down appearance that he does not appreciate that it may be an eye sore to others than himself.

Just go across the street from your shop. Take a good look at it. How does it compare with other business establishments? Is there anything about it that would lead you to look in the windows, or to go inside, assuming it belonged to someone else? Is it in a long row of buildings and does it look like every other store in the block? Is it all plastered with signs, or is there one sign that stands out and proclaims your business to all the world? Can you read this sign, a block away, or do you have to get right on top of the place before you know you are there?

You may not be able immediately to invest in a new building, but even if you have an old place, there is nothing to prevent your giving it a bright, clean coat of paint, say yellow, with blue trimmings, so folk will know you are alive, at least, even if they do not agree with your artistic temperament.

Now scratch your own bump of ingenuity and see what you can think of that will make your place more attractive from the outside.

No. 3—To Draw a Crowd

Do you assemble or repair batteries? Yes, way back in a dark corner of the shop, and no one knows how you do it, or why the expense runs up, or what it is all about. **Why not set up an assembly bench in your show window, for a Saturday night demonstration?** Everyone is out then, and no one has anything in particular to do except watch you and tell others about it.

Plan your demonstration. Have a few cards printed that you can hold up like the explanations in a movie to tell what is coming next. Show how you assemble plates. Show how the terminals are burnt on, how posts are formed, how straps are molded and separators trimmed. Perhaps a dozen more points will come to you, that are an old story in your shop, but are a mystery to the car owner.

Then when you have a crowd, display a sign giving your prices for various size batteries, for various popular cars. There is no limit to the good you can do for yourself in this way, and at minimum expense.

No. 4—Sell Them on Your Equipment

Have you a test bench? If not, you should have. And if you have one and use it for testing only, you are losing a large part of its value. True, it is designed, as its name implies, to test generators and starting motors, but the impression a demonstration will make on the Saturday night crowds will double its natural value to you.

After you have pulled the battery demonstration, rig up your shop window to demonstrate generator repairing. Get a generator that comes apart easily with two through bolts, we will say, and fix it up with a shorted armature. Show the crowd a test for field current. Then test the armature current drawn from the battery. Then run it as a motor and point to the jerky action of the ammeter needle on your test bench.

Now hold up a card labeled, "Shorted Armature." Then try to test it and show that it fails to show charge on your test ammeter.

Next remove the armature and perhaps give them an additional test demonstration with a growler or other testing device. Then use another armature and again make the same tests, showing that everything is now O. K.

Then put it on your test bench and show it is working, and bring out the point that you test all machines carefully before putting back on the customer's car.

No. 5—How About a Loud Speaker?

Instead of having signs to use in getting your ideas across to the crowd, it would not be much trouble to rig up a speaking tube and horn, leading to the outside of your show window. In making your demonstrations you can explain each step to the waiting crowd as you proceed from one thing to another.

Then if you have any especially up to date equipment such as an armature undercutter, you can demonstrate that and show the time it saves in comparison with the old hack saw blade method. If you have established a flat rate system, you can hammer home the fact that it is due to your modern equipment that such prices are possible.

No. 6—Does Your Stock Work for You?

The same thing that applies to your battery work applies to

your stock room. It is a necessary part of your business, but not appreciated by the outsider.

One way of making your stock advertise itself is to arrange the stock room at the front of the building so that one row of shelving, with parts arranged in glass containers will be easily seen from the street. This costs little and makes a great impression.

No. 7—Are You Buried in the Shop?

Many men make the mistake of being too much on the job. This works out nicely for the business that drifts in, but doesn't work out so well for the part that happens to drift right by, then gets the drifting habit and continues to go right by.

Get out once a week at least. Drive around to the various garages within as large a radius as possible. Be consistent about it, rain or shine, and show up at each place at least once a month, so that you get to know the garage men in your territory by their first names.

Ask them for work you can take along with you. Nine times out of ten you will be able to at least partially pay for the time of such a trip by the work you can bring along with you. Then don't let them forget you. Leave a card, or, better than a card, something useful, perhaps a calendar, perhaps a small card giving the freeze point of batteries at different states of charge, or possibly a card with decimal equivalents of inches on it.

Anything will do if it has something of value, besides your name on it, that will insure its staying out of the waste basket for a reasonable length of time.

No. 8—Work on a Cash Basis

Wide awake methods of getting car owners interested in your place will make them think about you; then when they need you they will come to your shop, and your business will grow by leaps and bounds. The next problem is one of properly handling your customers, and it is a big problem with many angles.

Again we find that the real men in the electrical business operate on a cash basis, and one help along this line is the display of a large sign in the shop, "All Work Cash. No Jobs Delivered Until Paid For." Then at the office or cashier's window a similar sign should be displayed, with the addition, "No Checks Accepted Unless Certified."

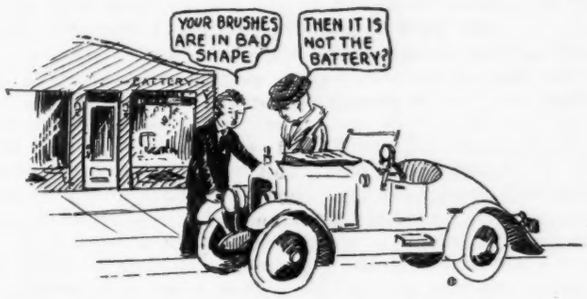
Now many men in the smaller communities and even in some fair sized towns will maintain that you can not stick to such a rule even if you make it, but in most cases this seems to be due to lack of crust, backbone, or whatever you want to call it.

For example, when Bill Holt comes in, and you have known Bill for quite a while, have smoked his cigarettes, and shot a game of pool occasionally with Bill, it is hard to turn him down, when he wants a new battery, or his generator overhauled, and wants you to wait until next Saturday.

Now there are many Bill Holts in every town and the fact of the matter is that if they could be depended on to really pay up next Saturday, they would also have backbone enough to save up a bit, and not have to ask for petty credit in this manner.

No. 9—What to Say

Suppose you have been an easy mark in the past. Do you realize that a dead beat who owes you money is not your



friend, but your worst enemy, as far as knocking is concerned?

The reason is simple. The fault is his own, but who is there among us that is willing to admit his own shortcomings? Then to explain why he does not go near you, he will dig up some knock and scatter it to the four winds, and you have not only a bad debt that you can not collect, but a negative advertisement ten times as costly as a real advertisement.

Talk to the Bill Holts in your town frankly but friendly. Tell them you have decided to handle your business in a different way. Tell them that it takes a mint of money to run a credit business, and you do not happen to have access to the government mint. Tell them it is a straight business proposition and a policy you intend to stick to impartially.

By doing so you can give better value for the money paid, and better satisfaction to your customers. What if you do lose a few customers? You will find that the best ones will appreciate the point and stand by you, even though they may grumble a bit at first. THESE STATEMENTS ARE NOT MERE THEORY. THEY ARE BASED ON INVESTIGATION OF REAL SHOPS THAT ARE FOLLOWING THESE PRINCIPLES. Others are doing it. You can, too.

No. 10—When to Give Credit

When an established and going concern that is practically as reputable as the bank with which you do business, sends you their regular order for a battery or some work they wish done, do not call them up and ask for cash. All rules must be used with discretion, and the cash basis is one of them, but the credit plan should be eliminated as far as the individual is concerned, unless possibly it is a man whose standing in the community is unquestioned, such as a bank president, or head of some large concern.

In the case of individuals, one successful battery and electrical station sticks to the cash basis with the exception of the sale of batteries, and on the purchase of a battery costing, say, $40 or $50, will take the man's note for half of the purchase price.

Having been stung several times, even in this method of handling the transaction, they now use judgment notes only, and find that the method is comparatively satisfactory.

Such a note enables you to have the matter handled by an attorney in case the man does not pay up at the end of the 30 days specified, but also requires that the purchaser pay the attorney's fee.

Your attorney can doubtless give you pointers that will assist in making sales that you can not put over on a straight cash basis.

Finally remember the dead beat's motto, "I'd rather owe it to you than beat you out of it." Then act accordingly.

No. 11—Taking the Job

The right man to greet the customer is a salesman, agreeable of manner, capable of talking intelligently with men of means and influence, and of course able to diagnose the electrical trouble on the car. If the generator or starting motor seems to be at fault, the customer usually wants to know how

much it will cost, and as far as the labor charge is concerned, a flat rate price should be quoted.

If the car owner wishes to know what the parts will amount to, it is necessary to make an estimate, and here is where many men make a serious mistake. A job needing a new armature will be quoted on the basis of the labor charge and the cost of this part. Then it may be found that the bearings are in bad shape, new brushes are needed, and the fibre of the rocker ring, or brush holder is so charred that a new one should really be put in to make the job safe.

Two courses for the service station are now open, and neither one leads to peace and plenty.

The first is to call up the car owner and tell him that additional parts will be needed, and it will cost him more than you originally figured. This usually makes him angry, for he feels you should know enough about your work to quote him correctly in the first place, and he is about right at that.

The other alternative, which leads to a come back, is to use parts which are good for some more service but which may go bad most any time. This also guarantees to bring the service man a definite amount of grief and trouble.

The only way out is to estimate every possible thing that may be needed on the job. If the armature is bad, estimate on brushes, rocker ring, bearings, and possibly a field coil, telling the customer that you will possibly be able to save the field coil, and that if he wishes to take a chance on the bearings you will put the old ones back in. Then if you find that you have overestimated, you can come down on the bill, and revive the man that may have been knocked cold by the original estimate.

The method is being used considerably, and a bill of $25 rendered when the original estimate was $40 is not nearly as bad as the same bill when the estimate was $20.

By this method you have also another advantage, for if all questionable parts are replaced, you can guarantee the job for a period of 90 days, we will say, and have so few comebacks, that you can afford to make good on any that might give trouble. On the other hand, if the customer elects to use any of the old parts, you can agree to handle the job that

way, at the same time explaining that you can not guarantee the work under the circumstances. This lets you out in case trouble develops later.

Another point now arises, as to whether any generator or motor will be repaired, without making it a thorough job.

Requests may come, for example, to install new brushes only, or to replace one bearing. The answer is that the successful shops will not take this class of work.

The thing to do is to sell the man on the advisability of a thorough, guaranteed overhaul, for if new brushes are put in, it may be a matter of months, or possibly only weeks before a short may occur that will again send the machine to the shop and tie up the car.

However, if the customer insists, the job may be handled with the understanding that no guarantee whatever is given, or it may be turned down entirely. Most good shops prefer to send such work away, for even when it is explained that

the work is not guaranteed, the customer usually comes back, and complains that the job was in a few weeks ago, and it's on the bum already.

The implication, of course, is that the work was not done right, and regardless of the fact that the job ticket may show all details of the transaction, such cases not only are unprofitable, but lead to endless trouble.

No. 12—The Flat Rate and the Profits

The flat rate has many advantages. It gives the customer some idea as to what the bill for labor will be. From a survey of the time required on a number of jobs the rates can be set so that there is a fair profit in the work. The flat rate brings in more jobs, and more jobs mean more parts sold, and it is in the sale of parts that the service station makes its real money.

Some shop men, however, will raise the objection that the men may take three hours doing a job on which the flat rate was estimated on a two hour basis. Under these circumstances the shop would be due to lose money.

No. 13—The Flat Rate and the Workman

The remedy for the above condition is to assign an allowable time for each machine that may come to the shop. Say, for example, that a Ford generator is figured as a $3 job and that the allowable time is two hours for removing, repairing and replacing. This means that the electrician handling the job may do it in an hour and a half or two and a half, but regardless of the time he takes he is allowed two hours on his time card.

Some shops pay on the basis of the actual hours worked, regardless of the job hours turned in in this way, at the same time requiring the man to turn in a full day's work of job hours. In the event that the man is slow, it means that he must work overtime to get in his time for the day.

This does not work a hardship on the men, if the time allowances are fair. It does, however, create a spirit of rivalry among the men in the shop, to see who can get out the most work, and if some one is slow on a job and fails to make it in the time limit, the rest of the men give him the laugh.

A system of this kind must have the co-operation of a good foreman of course, to see that the work is not slighted, and to see that it is carefully tested. Then to make sure that the men do not slip something over on the foreman, it should be thoroughly understood that each man is responsible for his own work and in the event of a comeback will have to make good on it by doing the job over in his own time.

To turn out real work in record time, this system could be supplemented with a bonus system of some sort, say a division of the extra profit between the man and the shop. For example if a man saves half an hour on a job he should be allotted a quarter hour extra pay for his share of the increased profit. The only objection to methods of this kind is the bookkeeping involved.

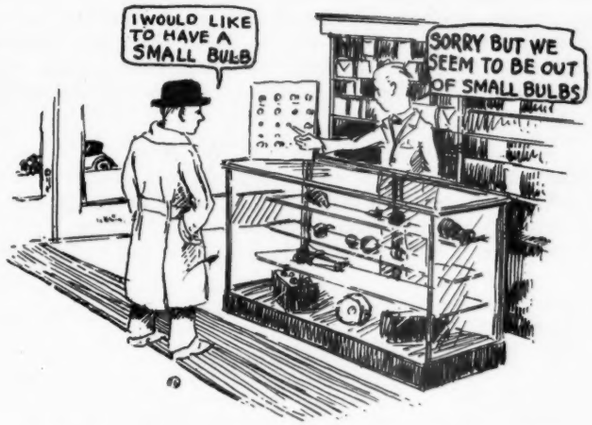
No. 14—Finishing the Job

Another practice which helps to sell the shop to the public is that of painting each job, whether it be a charged battery, a generator or a starting motor.

In the case of the battery the effect is double, being to pre-

serve the case, and to preserve the customer's good opinion of the shop. In the case of the generator or motor, it shows the customer that something has been done. An old machine, however, perhaps still greasy, even if it has a new armature, does not show anything that in the customer's mind will register in accord with the bill he has to pay.

Some will say that it takes too long, but we do not



mean that a high finish or a thorough paint job is necessary. Black paint with an alcohol base is available which will dry in about 15 minutes, while for other machines having aluminum end brackets aluminum paint can be used. With the black part nice and shiny and the old discolored aluminum refinished, it is surprising the value that the job assumes.

No. 15—Mark the Generator

Whether it be a starting motor, generator or ignition device, use some sort of a mark by which you can tell at some future date, just when the work was done. Then when the customer says I had this machine in here just last week, and you find it was eight months ago, you have some definite information on which to work. It may or may not be policy to tell the customer he is mistaken, but your stand can be taken on definite information, which is a much better platform than guess work.

No. 16—How About Stock?

Your stock may be divided into two general classifications, one being the material that is sold over the counter, while the other is the class of material that is used in connection with the repair work. There is, of course, no hard and fast division between these two classes of material.

Among the parts that are usually sold over the counter we find bulbs as prominent as any, and in the smaller shops the assortment often consists of a display board on which a certain array of the most popular types are set in holes. In most cases, however, it will be found that these boards are usually sold out, on the most commonly used types, and a few odd sizes only are left.

Customer after customer will drop in to get a bulb, only to find that, "Oh, we seem to be out of that kind, funny every one seems to want the ones we don't have."

This is about the worst kind of negative advertising you could have. You wouldn't permit a man to hang a sign on your building saying you were too lazy to serve your customers right, but you might as well do so as to treat them this way, for it gives the same impression. **Watch your stock. Replace the most commonly asked parts before they are all gone, rather than after you have disgusted a large number of customers.** It is better business and costs no more.

No. 17—Handling the Sponge

This kind of sponge is not the type used in washing cars, but is the man that has bought a battery, perhaps from you, if you are lucky, and comes to your shop every two weeks, to have water put in his battery. Now if it were merely a case of shooting water in the three cells or even six, it would be a small matter.

In most cases however, it involves removing a rug, then a floor board or two, and finally the real job of putting in the water. After you have done this 52 times or every two weeks for two years, and the time finally comes when the battery needs replacing, the man will say, "I don't see why I need a new battery, you have been taking care of it for me, what did you do to make it go bad."

Then for this reason or because the price of your product is high, he buys elsewhere, and you have to whistle for the money represented by the time you put in on him. To pay for this extra overhead expense you must necessarily charge more for batteries than some shop that does not conform to this practice, and this very thing will send the man you have favored to your competitor.

Now the fault is not alone with the car owner, for he has been educated by instruction books and advertisements of battery makers to expect this sort of thing, and it is up to battery dealers to raise such a dust that the makers of batteries will cease the practice of advertising free service, for it amounts to giving away something that is not theirs to give.

The remedy is not to be obtained by any patent medicine, designed for sick business, but by one of two common sense methods.

The first is already being inaugurated by one battery maker and is to establish a system of charges for this sort of work, 15 cents for putting in water and 25 cents for water, cleaning terminals and testing.

Where people have been in the habit of doing things in a certain way, it is not easy to change their methods. There is accordingly no question but what much patience and explanation will be needed before the free service practice will be eliminated. The making of very moderate charges however, will do two things.

First, it will partly pay for the time spent, and

Second, it will be equally valuable in getting customers out of the habit of getting things for nothing.

The other possible remedy for the loss involved in free service of this kind is to use a real salesman, for the purpose of meeting the customers. He should be able to talk to them at the same time that he is filling the battery, and should size up the car, for possible repair work, and accessories that may be needed. Of course, if you have nothing to sell, you can not make it possible for the salesman to pay his keep, and in this case you should use the charge system.

Things to sell should include something more than spot

light, for you can not expect to unload a spot light on every one that drives up, even assuming he needs it, and the progressive shop will stock up with a carefully selected line of the faster moving accessories, even going out of the electrical line to get items that sell readily. In this way the profits from sales will pay for the time lost in this method of advertising, and with the right man on the job you will be surprised at the sales, if a small commission in addition to his salary is used as an incentive.

Promises should be kept as well as made, and in the making of promises, a pessimist rather than an optimist should be employed. By this we mean that the average mechanic underestimates the time it will take him to do a certain job, with the result that the customer is usually back for his car before it is ready. In most cases it is well to estimate carefully and add an hour to make sure.

No. 18—Promises and the Waiting Room

Even with the floor man, well versed in the way the work is going in the shop and experienced in handling customers and estimating jobs, it will frequently be found that the car owner returns before the job is done. This means in most cases that he will wait for his car, and he should therefore be provided with a comfortable place to wait.

In the more up-to-date stations, an enclosure, with a rug, a few rockers, and a table with magazines, will be provided, and there is hardly a place so small but what at least one easy chair can not be supplied.

No. 19—The Shop's Liability

The provision of a waiting room means that it is not necessary for the car owner to wait in the drive way, and that there is less likelihood of an accident occurring. Liability for accidents is usually dependent on whether the shop management is shown to be negligent or not, and the provision of a regular waiting room would be a point in favor of the shop.

Over the drive a sign should also be used, warning of danger, and while it does not exonerate the shop in all cases it helps to show that all possible steps for the protection of customers have been taken. In the event that employes of the shop are allowed to drive customers' cars, liability insurance should be obtained, as a judgment for several thousand dollars will knock the spots out of the profits in the average shop.

No. 20—Protecting the Car

No one thing is more disgusting to the average car owner than to drive out of your place, and find his hands all grease from his grip on the wheel, or to find the seat of his palm beach trousers all black from the dirt left on the seat cushions.

Where it is necessary to work inside of the car, one shop makes a practice of removing the cushions and covering any other upholstering that might become soiled. Then if a final inspector, or the floor man checks up the car, he must wipe off the steering wheel and see that the car is really ready for the owner.

Some shops even go to the extent of dusting off the car, so that it presents a good appearance, even if it was dirty when brought in. This involves a question of judgment, of course, as to whether the indirect advertising thus obtained pays for the labor involved. The suggestion is to lean toward the clean car.

No. 21—Stopping the Leaks

In the average small shop, parts are used, the job is finished, and the bill is then made out to cover the labor and all of the parts, at least all that the man does not forget to put down.

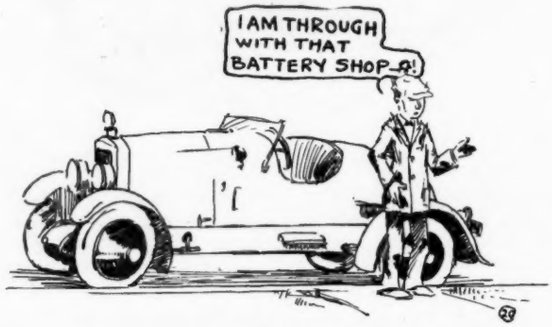
If a strict accounting were made, and an inventory of stock taken occasionally, it would be found that there was a steady shrinkage, in most cases, due to parts used but not charged out. The remedy for this is to charge out each part as used, and this is the method used in shops of any size.

It is also well to have all stock under the supervision of one man, and to hold him responsible for it. All the shop men requiring parts for jobs on which they are working will then come to the stock room window and, on presentation of the job number or order sheet, will be given the parts required. At the same time the parts will be charged out. Then when the job is finished and the labor charge put on, the charge for the parts can also be immediately figured.

No. 22—Fairness to the Men

Good service to the car owner depends to a great extent on the cooperation received from the men in the shop, and this in turn depends on the cooperation you extend to them.

A domineering superior attitude, will never get real coopera-



tion, although the men may appear to be subservient to your slightest wish. On the other hand it is not necessary to chum with the men in the shop, or hang around with them, smoking their cigarettes. A cordial but dignified attitude, and a sympathetic appreciation of their points of view will go a long way toward getting their real cooperation.

Comfortable working conditions will help a lot. A warm shop, freedom from draughts on the floor, comfortable creepers, with good head rests; all these things are appreciated. Lockers and soap and a place in one corner where the men may take a shower after the day's work, also help to make a winning team, and the fact of the matter is they do not cost much either.

Twenty-two special points have been brought out in these pages, most of them essential to the success of your business. Skill you must have in the use of the meters and in handling the various tools of your profession, but without some consideration for the business principles above enumerated, the technical ability will be of little value. Study these suggestions and use the ones that fit. You probably can suggest 22 others. All will help you. It is your business, make it work for you, not you for it.

23 Years Ago *This Week In* MOTOR AGE

(From Motor Age of Nov. 30, 1899)

Wrong Lever Mania

The automobile craze has developed a new disease named by a Philadelphia physician "wrong lever mania." There are in an automobile three levers—one to steer with, one to go fast with and the other to stop short. And the victim, the poor sufferer in this deadly crisis, forgets which is which in the matter of levers, decides to guess, and pulls, naturally, the wrong one. That is why, in an acute attack of wrong lever mania, Mrs. Herman Oelrichs, at Newport last summer, drove over a stone wall, up a flight of marble steps and through the stained glass windows of the music room of a friend. It is why Alfred Vanderbilt went swiftly in an automobile phaeton down one of the cliffs backward into the sea, and it is why Harry Lehr, in a petroleum T cart, completely demolished a greenhouse of glass. No remedy has been discovered for the disease which, though not necessarily fatal, is likely to result seriously to the victim and others.

Notes of Interest

The United States Express Co. has been experimenting with an auto delivery wagon in Baltimore. The results have proven so satisfactory that the company is considering the feasibility of gradually substituting autos in all places where they now use horse-drawn wagons.

Twenty thousand dollars has been appropriated for a track and grandstand at Vincennes, France, for the purpose of testing autos. Prizes will be offered for four classes comprising heavy trucks, cabs, victorias and "Voiturettes."

From the Table of Contents

A Self Starting Motor—A gasoline motor that is started by a supply of stored, compressed air provided by an auxiliary chamber in the cylinder which also furnishes air to scavenge the explosion chamber and thus give auxiliary power.

Problems Worked Out.—An English invention for clearing the explosion chamber of a gasoline engine of burned gases; a description of a conical roller bearing with comments on roller bearings in general; a practical tire patent.

New Equipment and Accessories At the A. E. A. Show

Exhibition Attracts Attention Because of Worthy Developments in Well Known Lines

THERE was extremely heavy buying at the recent Automotive Equipment Association show and one of the chief reasons for this (aside from the belief that a big year is ahead) was the fact that the new goods offered impressed the jobbers present as being worth-while articles.

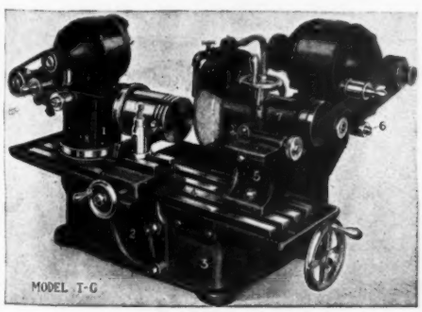
It was especially notable that most of the new articles were developments of old lines and were brought into being because of a demand for better and more economic equipment in the maintenance shops. There was little at this show of the freak, sensational or mere selling devices. The new articles on display are described here.

FRANKLIN MULTI-PURPOSE TOOL

The Franklin Machine & Tool Co. of Springfield, Mass., has been marketing a multi-purpose tool designed especially for refacing valves, cleaning carbon and sharpening small hand and machine reamers. To meet the demands for a tool having a wider range of application, this company has just announced a new machine, which is designated model "TG."

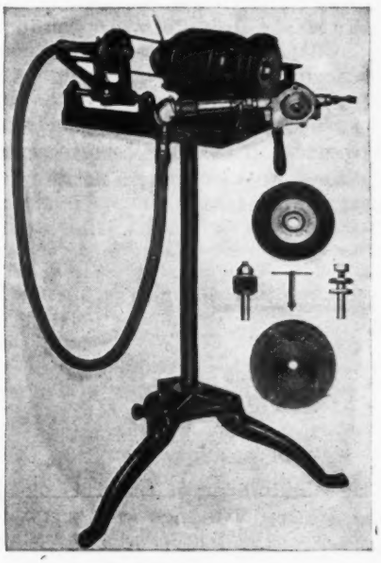
The model "TG" will accomplish the tasks of the former and smaller model in addition to which it functions as turning lathe and piston grinder. The work head of the machine receives its power for rotation from a ¼ hp. motor which is belt connected to the work head spindle. A wet grinding attachment is part of the machine and provision is made to provide continuous circulation of the cutting fluid.

The wheel head of the machine receives its drive from a ½ hp. motor mounted on a cross slide. A hand feed wheel graduated in thousandths controls the feed of the 10 in. grinding wheel.



GREEN PYRALIN VISOR

The Metal Specialties Mfg. Co., Chicago, displayed a visor made of green pyralin 1-32 in. thick. It has a double curve and is adjustable as to angle. One width fits all cars either open or closed. The edges of the Pyralin are metal bound so that there is no possibility of the transparent material being bent or broken. Price $7.25.



SIOUX FLEXIBLE SHAFT AND ATTACHMENTS

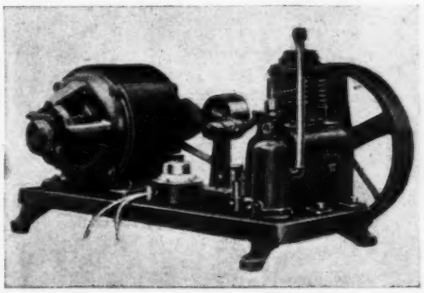
This machine can be used for a wide variety of work in automotive maintenance stations, repair shops or machine shops. It consists essentially of an alternating current ¼ hp. motor, stand, flexible shaft with universal joint and single control, three-speed drive pulley and belt, one 6 in. emery wheel and one 4 in. emery wheel and arbor, a 4-in. wire brush and arbor, one ¼ in. capacity Jacobs chuch, including arbor, and one No. 500 grinder attachment for valves.

The outfit is portable and it is only necessary to plug into a convenient receptacle for operating. The three-speed pulley provides the necessary speeds for large or small valve grinding. A feature of the flexible shaft is the roller bearing supports which insure the shaft rotating centrally at all times. The bearings are placed 6 in. apart, so that when the shaft is bent or curved during use it does not at any time come into contact with the housing. The shaft itself is music wire, the first winding is of small wire and is followed by larger sizes. Each wire is wound in the opposite direction. The machine is made by Albertson & Co., Sioux City, Iowa.

KELLOGG EM 52Y AIR COMPRESSOR

This air compressor is intended especially for gasoline filling stations because of the lower initial cost and reduced operating expense. It is furnished without tank and the pump is in operation only when inflating a tire. A telephone switch at the service point starts and stops the motor and the switch is opened only when the hose is removed. From one to four air lines can be used. It has approximately the same tire filling speed as a tank outfit, the makers state.

The compressor has a 1 hp. motor and the pump is a two-cylinder, 2¼ in. bore and 2 in. stroke, with an air displacement of 4½ cu. ft. per min. It is equipped with the switch, belt tightener, fan blades on pulley to cool pump fins, 30 ft. hose and all necessary parts. The whole outfit is mounted on a neat base. The telephone switch must, of course, be mounted at the point where the tires are inflated. It is made by the Kellogg Mfg. Co., Rochester, N. Y.



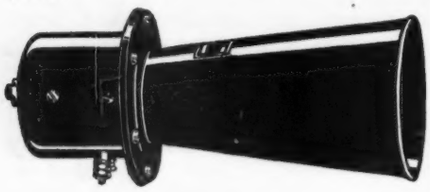
BUCKEYE BUSHINGS

A display of replacement bronze and bronze backed babbitt bushings was exhibited at the booth of the Buckeye Brass & Mfg. Co. The centrifugal process of depositing babbitt is utilized on the bronze backed bushings.

Miscellaneous and spring eye bushings are featured by this firm and for the guidance of the purchaser they have prepared a specification booklet. Data pertaining to the dimensions of piston pin, steering arm, king bolt, and tie rod bushings are included in this booklet,

KLAXON MODEL 8 HORN

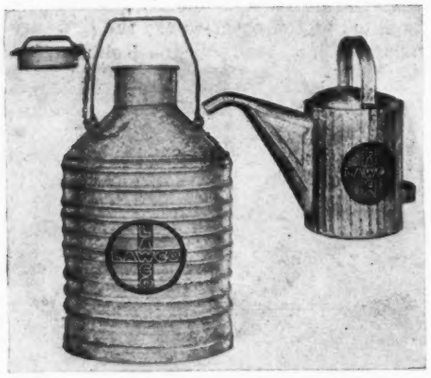
The new Klaxon model has the motor armature carried in ball bearings. This enables the horn to get up speed very quickly and therefore, the horn responds instantly to the press of the button. The initial discharge on the battery is considerably lower due to the fact that the motor does get away very quickly. Price $7.50.



LAWSON METAL PRODUCTS AND EQUIPMENT

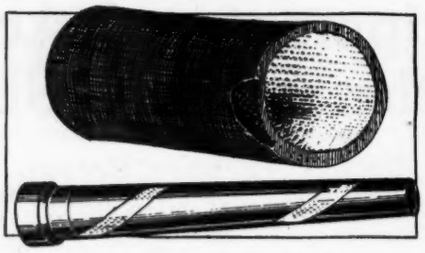
The F. H. Lawson Co. of Cincinnati, O., had on exhibition their full line of sheet metal products. Commercial car fenders, special stampings for the Ford car and a selection of oil, gas and water dispensing equipment are featured. The illustrations show the two new gas and water containers.

The Lawson Co. is doing considerable educational work among service stations in an effort to further the use of galvanized ware. It is claimed by this firm that galvanized construction permits a lower price to the purchaser. Applying the tin coating after the vessel has been formed makes possible a container that will stand as much if not more misuse than the copper plated ware, it is claimed.



"GENASCO" PRODUCTS

The Barber Asphalt Co., of Madison, Ill., which has supplied its products to the paint and allied industries, has recently perfected a method of distilling a solid hydrocarbon. The solid hydrocarbon appears in a semi-crystal form, the base of which is paraffine. It is claimed by the manufacturer that the distillation process insures uniformity of the product which is now being offered in oils and greases bearing the trade name of "Genasco."



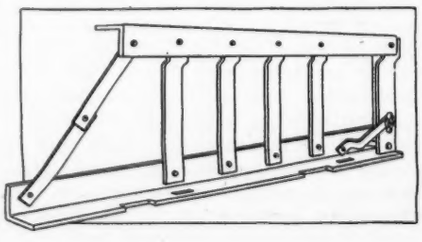
VOORHEES RUBBER HOSE NOZZLE AND RADIATOR HOSE

The rubber hose nozzle, made by the Voorhees Rubber Mfg. Co., Jersey City, N. J., is of rubber, which is soft and flexible enough to prevent its injuring the finish of the car and permit it to be bent to get it around wire wheels. It is sufficiently rigid, however, to maintain a steady stream of water and it will not collapse. The radiator hose has a brass wire insertion, rubber being vulcanized right through the mesh of the wire. The wire prevents swelling and strain on the hose after it has been in service for some time. Price: Nozzle $1.50, radiator hose 40 cents.

MOSSBERG WRENCHES

The utilization of several display boards carrying wrench assortments for the service station were used by the Frank Mossberg Co., of Attleboro, Mass. The firm has available these display boards which group the special socket wrenches required for quick servicing of any particular vehicle. Many new models of wrenches have been added to the line, three of which are illustrated.

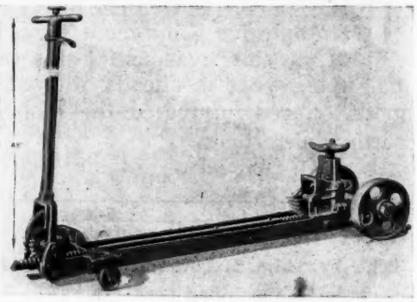
The spring perch wrench No. 634 is designed to facilitatae the installation of shock absorbers on the Ford car or any work that requires the removal of the spring perch nuts. Tool No. 649 is a new addition to the Mossberg line and is designed to remove stubborn headlight rims of the Ford headlamp. Tool No. 652 is designed exclusively to assist the operations on the Ford universal joint assembly. The wrench is of 7-32 in. stock.



MANLEY GARAGE EQUIPMENT

The Manley Mfg. Co. of York, Pa., had a number of new pieces of garage equipment. One of these is a combination engine and axle stand designed especially for Dodge service. It is so arranged that it will handle either the engine, transmission or axle.

A quick acting jack for lifting either



the front or rear of a car or truck was also shown. Its construction is such that the slack can be instantly taken up without working the handle, and the operating lever is so designed that it can be worked either in a vertical or nearly horizontal position. Thirty degrees of motion is sufficient to work from one ratchet tooth to the next, so that there are three operation positions between the horizontal and vertical planes.

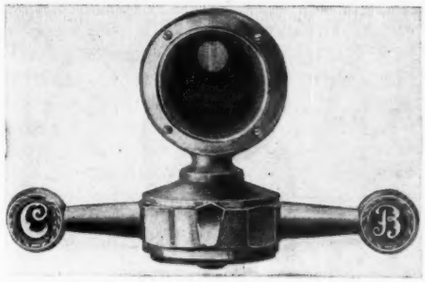
A garage light was also shown, this being adjustable to any height, either for working on top or under the car, and had a connection for readily attaching an electric drill or other power driven tool.

ROTH LUGGAGE CARRIER AND EXHAUST HEATER

The C. A. Roth Mfg. Co. of Hastings, Neb., showed a luggage carrier of novel construction, it being designed to quickly fold down, so as to form a metal bead for the running board, when not needed. It also showed an exhaust heater for Ford cars, it being priced at $1.10.

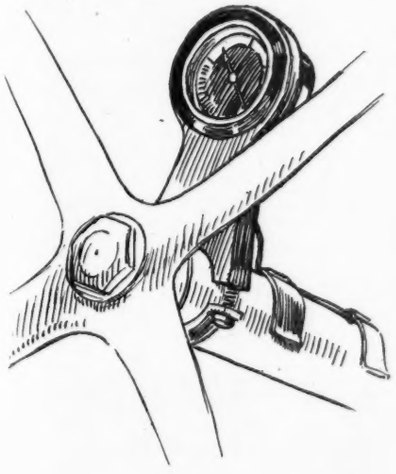
MOTO-METER

The Moto-Meter Co., Inc., of Long Island City, New York, displayed some new models of Moto-Meters. One of these is the Midget Model, which is especially designed for use on Ford cars, but is made in a very substantial manner and of better appearance than previous models for Fords. Glass is used on both sides, which not only adds to the appearance but also protects the markings from deterioration due to the elements. The list price is $4 with black



cap or $3.50 without cap. This Midget Model is also incorporated into a model known as the Ford Aristocrat, which incorporates a locking cap and sells for $7 list.

The locking cap has handles extending at each side and each handle terminates in a ball. These balls are so designed that they carry ornamental initials, which can be supplied in accordance with the owner's requirements. As regularly supplied, the space for the initials has an ornamental filler, which can later be replaced. A postal card system is used, and when the postal card has been filled out and sent to the factory the proper initials are sent to the purchaser and can then be used in place of the standard ornamental design that comes with the device. This obviates the



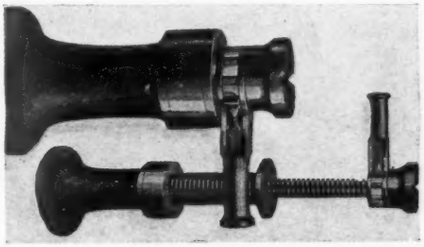
necessity of the dealer carrying a large supply of caps or initials.

A steering column type of Moto-Meter is also offered, the instrument itself operating like a pressure gage, and being actuated by a column of alcohol, which operates through a capillary tube from a bulb mounted at some suitable point. With water cooled cars, the bulb of alcohol would be mounted in the cooling water, while in an air cooled car it would be located in the air which is just leaving the cylinder, say, in the chamber behind the flywheel where air from the engine is at its maximum temperature.

In connection with the servicing of Moto-Meters, a service assortment of screws, rims, crystals and similar parts is supplied to Moto-Meter dealers for $5 net, the profit from the sale of these parts being more in the good will established by the service rendered than an actual monetary gain. With this assortment, a three way socket wrench is also supplied, this being designed to fit the various sized nuts that hold the Moto-Meter to the filler cap. These nuts being inside the cap are rather inaccessible without a suitable wrench.

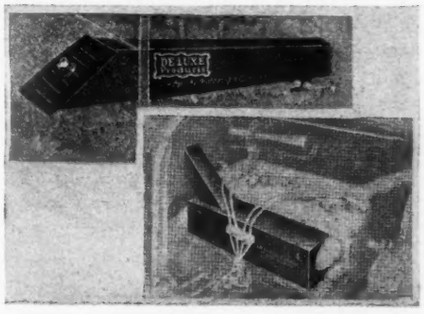
HART-BELL TRUCK JACKS

Hart-Bell Mfg. Co., Poughkeepsie, N. Y., showed two new truck jack models. Model 10 is a ten-ton model which is 11½ in. high and has a raise of 10 in. The model 15 is the same as the model 10 except that it is geared down to give it capacity of 15 tons. Both models are the same price, $20. The price of the model 5 has been reduced from $13 to $10 and a new touring car jack is being turned out to sell for $8.



ARVIN HEATER

The Indianapolis Pump & Tube Co., Indianapolis, Ind., displayed a heater which consists of a stove to fit around the exhaust manifold and conduct the heat radiated from the manifold to the drivers' compartment. The amount of heat admitted to the compartment is regulated by a valve on the instrument board. Packed in individual cartons, 12 cartons to a case. A model for the Maxwell car sells for $6, for the Dodge $7.50.

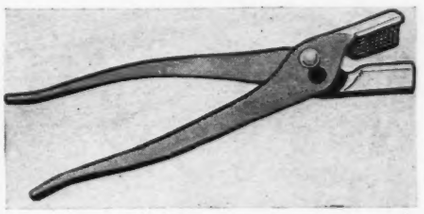


PYRENE FIRE EXTINGUISHERS

Two additions have been made to the line of fire extinguishing apparatus marketed by the Pyrene Mfg. Co. The carbon tetrachloride type is still manufactured and is featured in the small hand sizes of extinguishers. The new products

are called Phomene and Guardene. The former is being marketed in the 2½ gal. container which is the standard wall size. Twenty gallons of foam are ejected by the 2½ gal. tank and the device is recommended as a fire fighter in establishments where paints and lacquers are stored.

Guardene is the Pyrene Co.'s name for their acid and water type of equipment which externally has the appearance of the conventional extinguisher of this type. The method of discharging the contents is unique and it is claimed that the tank can be charged after usage in less than five minutes. Both the Phomene and Guardene extinguishers are recommended for service where the duties are not as heavy as would necessitate the use of a liquid carbon extinguisher such as the Pyrene. Neither of the new devices mentioned are for use where they may be subjected to freezing temperatures.



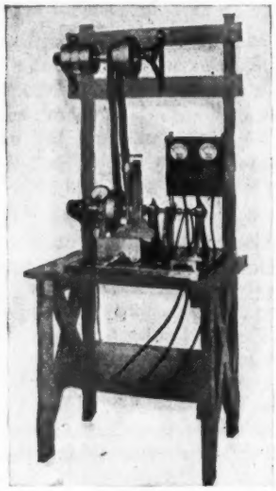
BONNEY BATTERY AND GREASE CUP PLIERS

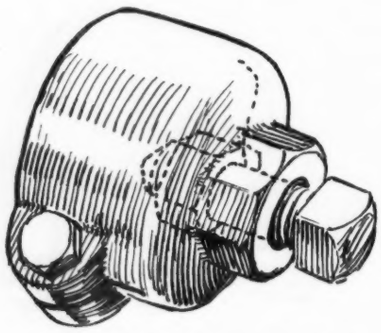
Pliers, designed to grip battery posts and terminals and to operate grease cups from any angle, are made by the Bonney Vice & Tool Works, Inc., Allentown, Pa., to sell at $1.50. The teeth are cross-milled in double concave jaws. The same sliding rivet pivot that is used in ordinary pliers allows a considerable range of sizes to be handled. Length 9 in., weight 8½ lbs. a dozen.

"ADD-A-UNIT" TESTING STAND

The Joseph Weidenhoff Co. exhibits included a display of electrical testing equipment, consisting mostly of devices that have been on the market for several years. A new article introduced is a test stand, known as the "Add a Unit," which is built on the principle of the sectional bookcase. It is so designed that, as the requirements of a small service station develop more elaborate, standard units may be added until the stand is brought up to the requirements of the establishment.

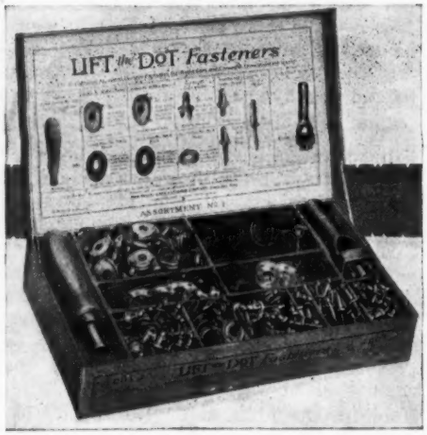
The assembly as shown is for use where power is taken from a line shaft. The countershaft is fitted with tight and loose pulley provision being made for a crossed belt to give right and left rotation. Power is delivered to the generator under test by direct chain drive from the jack shaft. Tachometer, instrument panel, adjustable spark gap, and spark coil testing devices are optional and may be added as required.





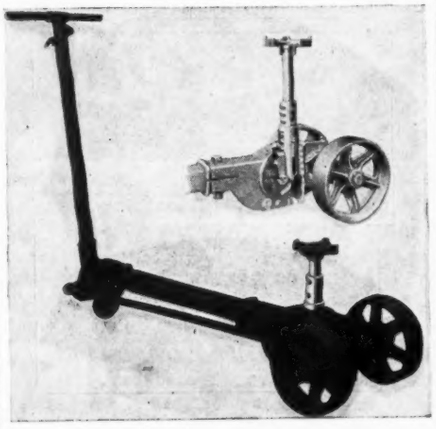
LE COMPTE WHEEL PULLER

The casing of this puller is of conventional type, clamping around the threads of the hub. The driving screw instead of being threaded directly into the casing, goes through a nut which is carried in a hexagonal recess inside the case. This prevents the nut from turning but allows of the screw being pounded with a hammer, in which case the hammer blow is communicated directly to the shaft and not to the casing. Made by the Le Compte Co., Newark, N. J. Price $1.



CARR FASTENERS

Among the many merchandising assortments which seem to be the feature of the show this year, are the very cleverly arranged packages shown by the Carr Fastener Co., Cambridge, Mass. Their "Lift-the-Dot," "Common Sense" and "Durable Dot" fasteners are all being sold in attractive box assortments. Each box contains all the different patterns together with necessary tools for attaching them. Besides the large box assortments there also are small assortments for retail sale to be used by the owner in making slight repairs. Refill packages are furnished to take the place of the exhausted compartments in large packages as fast as they are sold.

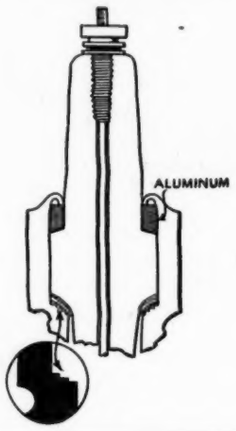


WEAVER "NEW WAY" JACKS

Weaver Mfg. Co. of Springfield, Ill., had on exhibit only a few items of an extensive line of service station equipment. The center of attraction at this booth was the new Model B "New Way" jack. Several of the features of the model "A" are retained, although the new model has several constructional differences. The sleeve support of the standard is a noteworthy feature of the jack, as it permits of an unusually high lift without the usual tendency towards binding of the standard. The range of lift is 9½ in. with a minimum height at the lowest position of 8 in. Roller bearings are used throughout.

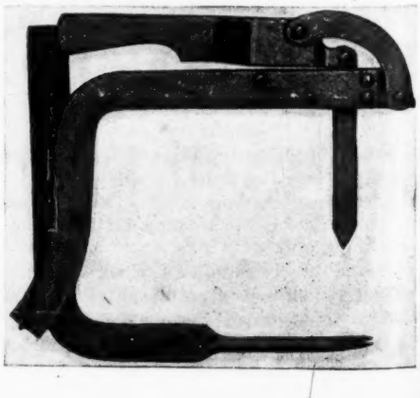
BOSCH SPARK PLUG

An old spark plug with several new refinements is being brought out by the American Bosch Megneto Corp. Instead of crimping the steel shell directly upon the porcelain, as heretofore, there is a deep aluminum washer inserted to separate the two parts. The idea of this washer is that its co-efficient of expansion forms an exact compensation between the co-efficients of porcelain and steel. This feature is claimed to prevent all undue stresses caused by the heat of the plug and forestalls all tendency to crack or become loose. Where the porcelain rests against the shell at the bottom there is a new type of asbestos washer which is closed at its lower extremity, thus preventing the asbestos filling from working out. A further safeguard against the shifting of this washer is by means of a sort of toothed seat which holds the washer rigidily in place.



RED CAP VALVE LIFTER

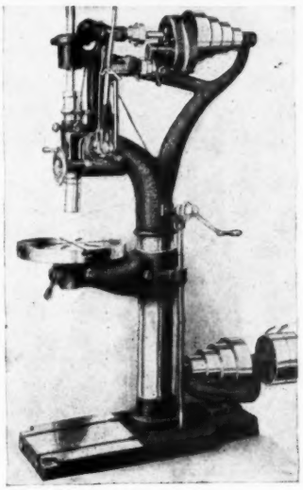
A device that should facilitate the work of the maintenance man is the Red Cap Valve Lifter, made by the C. A. Roth Mfg. Co., Hastings, Neb. It is designed so as to be suitable for different valve stem lengths. The lower arm, which lifts the spring, is adjustable and when the forked lifter is in place, can be locked by turning a wing nut. The upper handle is then lifted, and the spring is compressed and held in that position. This is accomplished by the toggle joint construction which enables the lever to go over center, so that the handle need not be held, leaving both hands available for the work to be done.



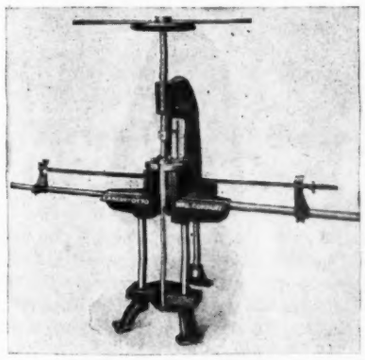
CANEDY OTTO DRILL AND PRESS

Two new articles of service station equipment in addition to the standard line of burning in machines and engine stands were shown at the Canedy Otto booth.

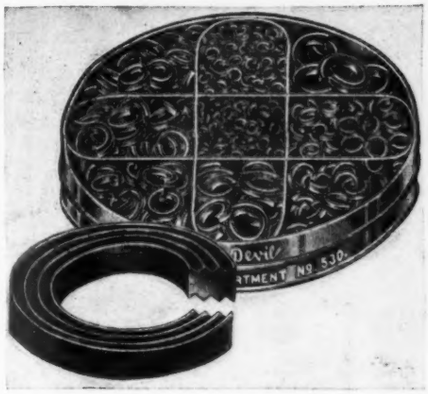
The 21 in. upright drill is one of these two new items which are illustrated. The drill has a diameter capacity of 0



to 1½ in. and will drill to the center of a 21⅛ in. circle. It is equipped with four step cone pulleys of 2 5/16 in. face. It can be furnished with plain lever feed, wheel and lever feed or a combination of the two. A back gear or power feed are furnished on request. The horsepower required is 1½ and the weight is approximately 700 lbs.

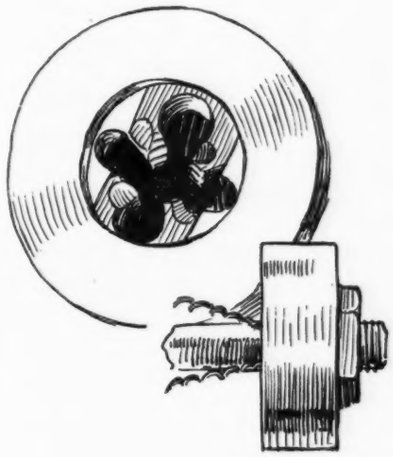


The other new device is the Model 3½ combination arbor and straightening press. The pressure screw is of carbon steel with a No. 6 Acme thread, which will produce 30 tons pressure. The capacity is six feet between centers. A feature of the device is the combination centers which are slideable and carry vee blocks to accommodate a shaft which is to be straightened from the datum point supplied by the shaft journal. The maximum distance between centers is 72 in. and the weight is 645 lbs. Made by the Canedy Otto Mfg. Co., Chicago Heights, Ill.



CORCORAN LOCK WASHER

This lock washer is a new pattern, in that it has upon each face, three concentric grooves which form together four sharp ridges. It is claimed for this washer that these ridges, forming as they do at the offset ends, will form much firmer contact between the nut and bearing surfaces. The washer besides being put up in 100 to 1000 size packages, are also furnished in assortments, especially for garage use. These assortments are packed in metal boxes with tight covers, in nine of the principal sizes, containing 530 washers and listed at $7.70. They are called Red Devil washers and are manufactured by Smith & Hemenway, Inc., Irvington, N. Y.

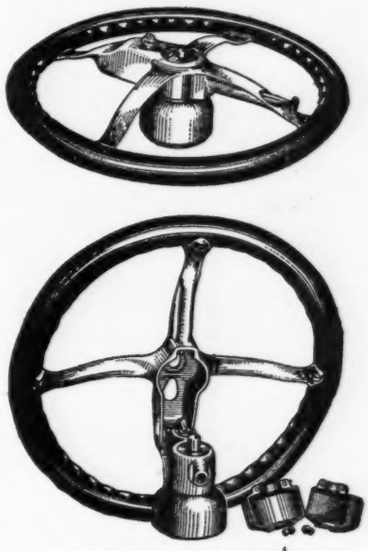


SELF-CLEANING DIE

A new type of threading die is being manufactured by the Conant L. Donelson Co., Conway, Mass. The principal feature of this die is that it has a little scoop shaped recess on the side of each cutting projection, which is claimed to give the die a self-cleaning quality. Each die is made in two sections which are interchangeable and which will feed equally well from either end. It is made in all standard sizes.

SPENCER LOCK TILTING STEERING WHEEL

This is a combination of a wheel lock and tilting wheel in which the working parts are enclosed in a hardened steel forging, which makes them thief-proof. The wheel spider is of heavy die-cast aluminum hinged in such a manner that the lock may be operated while the wheel is in either the tilted or down position, and is fitted with horn button. It is made for Ford, Dodge, Chevrolet, Overland, Maxwell, Star and Gray cars. Packed in individual cartons, 10 to a case, by the Spencer Manufacturing Co., Spencer, Ohio.



Model for Ford Cars

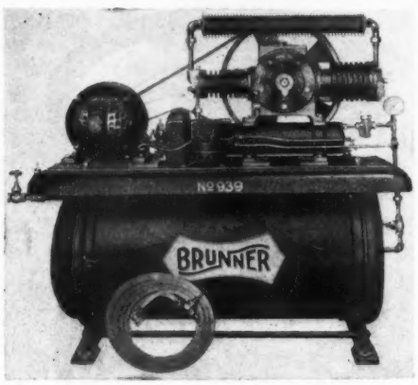
IMPERIAL CARBURETER CONTROL AND GASOLINE STRAINER

The Imperial Brass Mfg. Co. of Chicago has come out with a number of items. One of these is a Ford Carbureter Control. This is designed so that the needle valve adjustment can be operated from the cowl board. One vertical rod comes up from the carbureter and is connected by a pair of cogs to another rod that is nearly horizontal. This rod runs through to the cowl board and carries an indicator, which turns over a graduated scale, so that when a good setting is obtained the position can be easily noted for future use.

A gasoline strainer and sediment chamber for use in connection with vacuum tanks was also shown, this being mounted on the tank. It is designed with a glass sleeve, so that the action can be seen and the accumulation of sediment noted. Another novel device that was shown among the other garage tools is a motor cleaner. This consists of a spray nozzle designed with two connections for using air pressure to force kerosene vapor over the surfaces to be cleaned. The construction is such that a rubber tube connection can be made, or the regular air chuck can also be attached, so that no special fitting will be needed.

THREE NEW BRUNNER AIR COMPRESSORS

Several models of the Brunner air compressors have undergone slight modifications, but three brand new types, models 932, 939 and 965 have been added to the line. The model 932 has been brought out to meet the needs of the majority of dealers who require air service. It is not sufficiently large for the shop which uses pneumatic tools, nor for the oil station which operates its pumps by air pressure. The model 932 is self-operating, having an unloader which maintains the desired tank pressure and at the same time relieves the motor of the starting load. All pipe fittings are



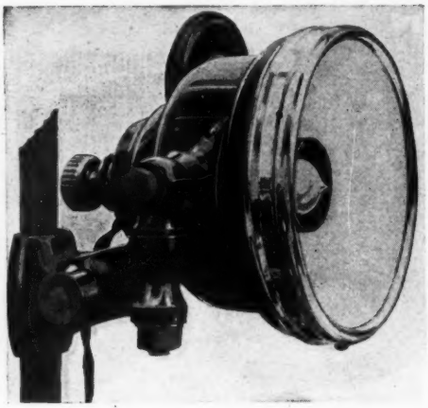
of brass and the general features of the outfit follow the usual Brunner construction. The price on this outfit ranges from $325 to $340, depending on the motor equipment.

The model 939 is said to be the fastest working 3-4 hp. unit built. Pressure in the 32-gal. tank rises from 0 to 175 lbs. in less than 25 min. This efficiency is said to be obtained by the dual valves, larger intercooler and snugly fitted, polished pistons. This outfit ranges in price from $370 to $394.

Model 965 is a heavy-duty assembled unit and has ample capacity, it is stated, to meet the needs of the largest and busiest filling stations. The assembly is very compact. The top of the compressor is 48½ in. from the floor and the outfit is 65 in. long, with a width of 22 in. The weight, 775 lbs. is too great for overhead location. The price range is from $530 to $580.

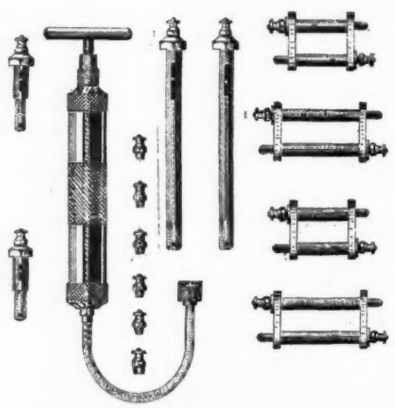
GRIPRACK LUGGAGE CARRIER

The Griprack is an all steel device which attaches to the edge of the running board and, when in the extended position, forms a guard for holding suitcases or any other luggage. It is self-inclosed, dust-tight and provided with slots for straps. Style A for Fords, Chevrolet and Dodge cars is 44 in. long and sells for $5. Style B for Studebaker, Buick, Nash and similar cars is 56 in. long and sells for $6, while style C for Hudson, Cadillac, Marmon and other large cars is 69 in. long and retails for $7. The device is enameled black, the finish being baked on. It is made by the Milwaukee Motor Products Co., Inc., Milwaukee, Wisconsin.



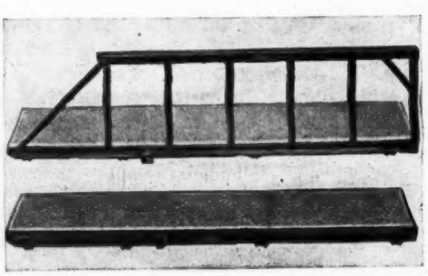
WAKEFIELD SPOTLIGHT

The F. W. Wakefield Brass. Co. of Vermillion, Ohio, maker of spotlights, featured one of special design. This in general appearance is like the conventional types. It contains, however, a cylindrical sleeve of red glass which can be pushed forward, by operating a thumb lever, so as to surround the bulb. By this construction the spotlight can be made into a red warning signal when occasion requires.



ROSE LUBRICATION SYSTEM

The Frank Rose Mfg. Co. of Hastings, Neb., showed a lubricating system designed for the chassis of the Ford car, special spring shackles, tie rod bolts, spindle bolts and necessary fittings being provided, and a force pump being used to inject grease to the wearing parts. This lists at $8.64.



PRESTO RADIATOR HEATER AND CIGAR LIGHTER

Considerable improvement has been made in the design of the Presto automobile engine and radiator heater made by the Metal Specialties Mfg. Co., Chicago. This is an electrical heater of a portable type to be hung in a small garage or under the hood of a car. A single heating coil is now used instead of the double coil formerly used and the price has been reduced from $5 to $3.50.

M. AND R. TIMER FOR FORDS

The raceway of the timer, made by the McCulloch Mfg. Co., 216 High St., Boston, Mass., is in four sections made from seasoned rock grain fibre. The retaining ring binds the four piece raceway and in combination with the fibre washer, fitted around the contact post, keeps the raceway rigid and prevents the posts from touching the shell. The contact segments are made of steel which has the same wearing qualities as the fibre.

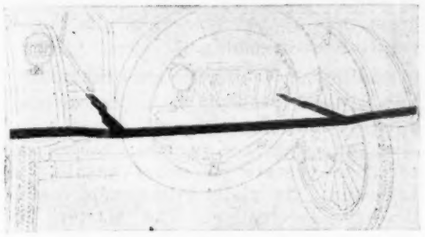
ALVORD COMBINATION REAMER AND FACING TOOL

A new combination reamer and facing tool, for reaming the spindle body bushings of the Ford car, and at the same time facing these bushings so that the spindle body will accurately fit between the front axle trunnions, has been added to the line of the Alvord Reamer & Tool Co., Millersburg, Pa.

The company also has a pilot reamer of expansion type, for reaming Ford Spindle Bolt bearings in alignment. The expansion feature compensates for wear and permits of accurate work with bolts which vary slightly in size. In addition there is a complete line of service tools for the Chevrolet 490 and FB and Overland "4" cars. These tools have all been designed from authentic specifications obtained from the manufacturers, and include all necessary reamers, in straight or spiral flutes, with or without pilots. The line also includes a number of special tools designed for various operations on these cars.

MARQUETTE EQUIPMENT AND SPECIALTIES

A line of metal goods specialties for the general trade and special equipment for the Ford features the exhibit of the Marquette Mfg. Co. of St. Paul, Minn. Three articles have been added to the



line during the past year, a rim tool, shock absorber and combination fender brace and rear bumper for the Ford passenger car.

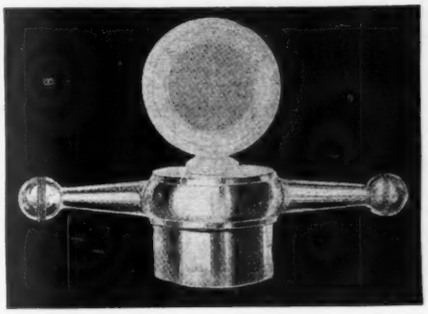
The fender brace shown is of angle iron construction and has its anchorage at the wooden sill of the body. The price is $4.75.

The shock absorbers (not illustrated) are of the modified cantilever type and utilize Ford standard bushings at all journaling points. The price per set of four is $17.

The all metal universal rim tool is illustrated. The forward arm is pivoted so as to swing to the right, thus coiling the rim into a smaller circle instead of pushing the end in. It is also pivoted to swing straight up out of the way when rim is being placed or removed from the table. The threaded spindle is 1⅛ in. in diameter with square threads. Weight complete is 120 lbs. and the price $30.

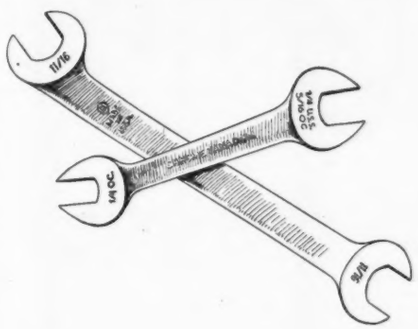
LEMPCO AXLES AND DRIVESHAFTS

The axles and driveshafts are made in sizes for practically all passenger cars by the Lake Erie Metal Products Co., Cleveland, O. A display rack which holds nine shafts is furnished to dealers stocking the axles. The axles are made of heat treated open hearth steel, which is machine straightened after rolling. The carbon content is 40-50, maganese 60-80 and sulphur, silicon and phosphorous not exceeding .005.



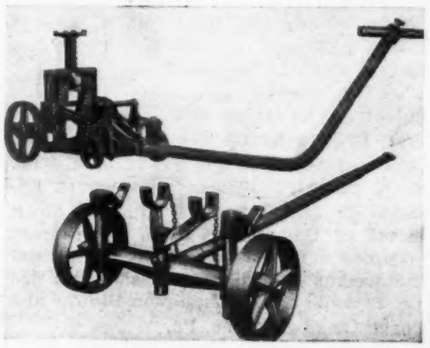
LeLUXE RADIATOR CAP

This cap is so made that the ball handle is brought down close to the radiator and an adjustable feature allows the ball arms to be brought parallel to the radiator. No drilling is necessary in attaching the cap and the sleeve covers the filler neck of the radiator. The cap will fit all original Ford radiators and can be supplied without the sleeve for use on replacement radiators which have a straight filler neck. Lecompt Co., Newark, N. J. Price $1.25.



BONNEY CHROME VANADIUM TAPPET WRENCHES

The wrenches are made in five sizes with openings of 1-2, 17-32, 9-16, 5-8 and 11-16 in., by the Bonney Forge & Tool Works, Allentown, Pa. It prices from $1.10 to $1.20. The wrenches are made very thin, being 5-32 in. thick at the head for the first three sizes and 3-16 in. for the last two. They are made of chrome vanadium steel to provide extra strength to offset the thinness of the wrench. The steel is heat treated.



"CIRCLE S" WINDSHIELD CLEANER

The chief drawing card at the booth of the F. M. Stewart Mfg. Corp., of Chicago, was the cutaway working model of the "Circle S" windshield cleaner. An inside adjustment is incorporated in the design. The motion of the squeegee is supplied by a vacuum operated oscillating mechanism, enclosed in the enameled case. The actuating unit has few metal parts, a double rubber bellows is caused to expand and contract, thus supplying the intermittent forward and backward motion to the squeegee.

MAYO SKINNER WINDSHIELD CLEANER

A new model of windshield cleaner which has been recently developed by the Mayo Skinner Co., was shown for the first time at the show. The new cleaner incorporates many of the features of the previous standard model, but is of smaller overall dimensions. As with the larger style put out by this concern, the new model is vacuum operated through connection with the engine manifold. Better production methods have made possible a lower price on the new model, which sells for $5.

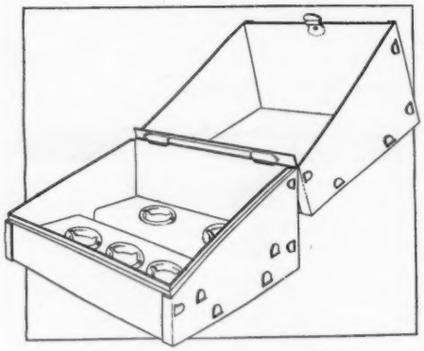
NATIONAL STANDARD EQUIPMENT

Approximately eighteen different models of automobile jacks are listed in the catalog of the National Standard Co., of Niles, Mich. This firm is now featuring a new towing truck and easy lift type of car moving jack, which are here illustrated.

The towing trucks are furnished with either plain or rubber tired wheels and weigh 215 lbs. A collapsible tongue is furnished which has a range of extension of from 7 ft. 3 in. to 12 ft. The No. 65 and No. 66 easy lift jacks designate the models intended for passenger and trucks respectively. The truck jack weighs 110 lbs. and the passenger car jack 80 lbs. Both jacks have a range of elevation of approximately 5 in.

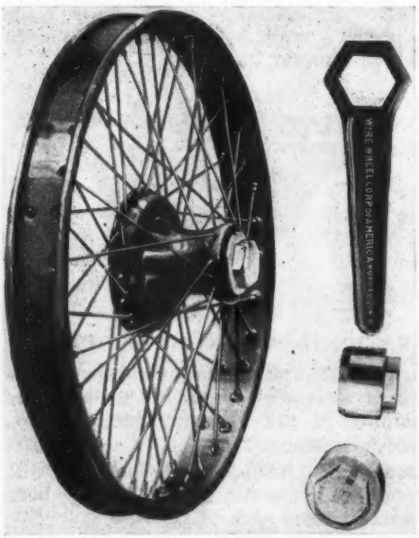
DOVER BULB BOX

The bulb box, made by the Dover Stamping & Mfg. Co., Cambridge, Mass., holds five bulbs and is made of steel, it opens with a spring latch and the bulbs are held in place by spring and very much the same way they are held in place bayonet socket. The box is 3⅞x3⅛ x3⅞. Each box is packed in a carton, 12 cartons to a shipping case. Price $1.



NEW TYPE HOUSE WIRE WHEEL

A new type House wire wheel, made by the Wire Wheel Corp. of America, Buffalo, N. Y., bears the model number three and has a distinctive hexagonal hub cap. This cap is heavier, provides greater bearing surface for the wrench and permits greater leverage on the wrench when the wheel is being put on or removed. The hub caps are stamped left and right and have arrows indicating the direction to turn for off or on. The wheels are supplied in sets of five with a carrier for the extra wheels, four inner hubs, four hub caps, hub cap wrench and a spoke nipple wrench.

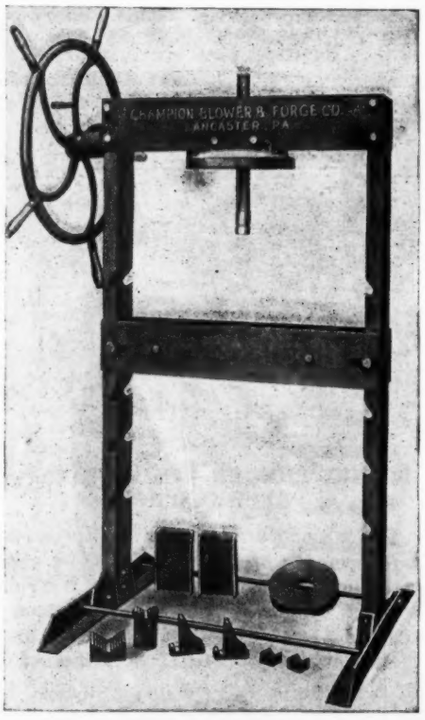


STRAIGHTLINE FAN BELT

These belts are made of canvas turned in and machine stitched lengthwise. They are treated with a preparation to resist the action of oil. Made for all models of cars and trucks. Each belt is packed in an individual box, 10 boxes to a carton. Rossendale-Reddaway Belting & Hose Co., Newark, N. J.

E. A. WINDSHIELD CLEANER

The E. A. Laboratories of Brooklyn, N. Y., were showing an electric windshield cleaner, this being driven by a small electric motor with 40 to 1 gear reduction. This was said to draw 2.75 amp. at 6 volts and to produce a force of 13.5 lbs. at the center of the moving arm.



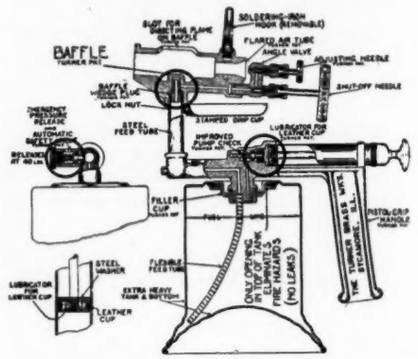
CHAMPION 30-TON PRESS

This garage and service station press has a leverage whereby 100 lbs. exerted on the hand wheel develops 75 tons pressure on the screw. The hand wheel is geared three to one with heavy inclosed bevel gears operating a 2 in., 4 pitch, acme thread screw. The hand wheel, weighing 57 lbs., is used as a flywheel to run the spindle up and down quickly. The table can be raised or lowered by one man. The uprights are 5 in. channels, with cross bars 6 in. wide by ⅝ in. thick. The width between uprights is 32 in. and the up and down travel of the spindle 9 in. The press occupies a floor space 36 by 39 in. and the weight is 485 lbs. It sells for $80 and is made by the Champion Blower and Forge Co., Lancaster, Pa.

TURNER "MASTER" BLOW TORCHES

The Turner Brass Co. of Sycomore, Ill., has long been known as a manufacturer of blow torches and gasoline furnaces. The most recent addition to this company's line is known as the "Master Series" of blow torches. A sectional view of the construction is shown and is self explanatory. The tank is filled from the top by removal of the burner mechanism assembly.

Additional features are the safety valve, which prevents an excess of pressure forming in the tank, and the hot spot or preheater which enables the torch to operate on either gasoline or kerosene. The pistol grip handle carries the pump mechanism. The "Master" line of torches is being manufactured in several different models, ranging in price from $12 to $16.

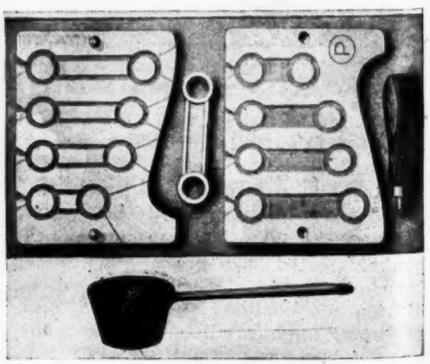


OHIO BATTERY STATION EQUIPMENT

A very extensive and diversified number of articles were being shown at the booth of the Ohio Pattern Works & Foundry Co., of Cincinnati. In the past this firm has concentrated on the production of storage battery terminals. The activities have been extended to include a line of sand and die castings and a full line of battery station equipment.

One of these is the "O-P" speed ladle which is illustrated. The bowl is three in. in diameter and the list price is $1.20.

Various molds for casting the pillar cups, straps, and cell connectors attracted considerable attention. Most popular of these molds was the screw mold which enables the battery man to make his own lead headed terminal screws.

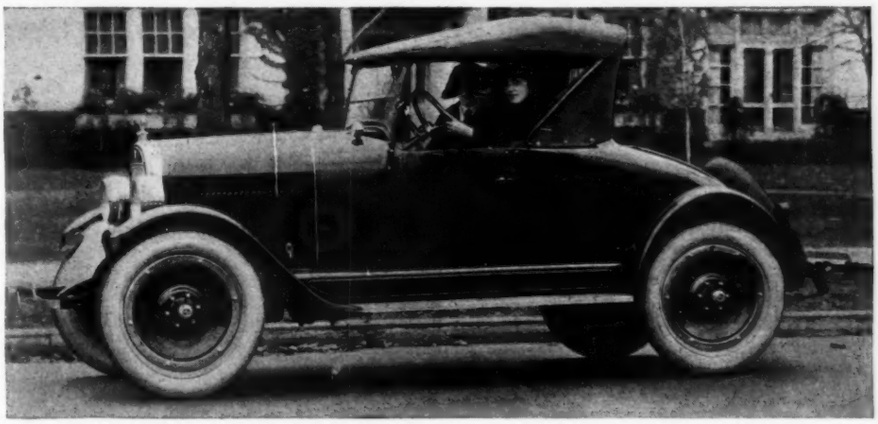


Developments in the Car and Truck Fields

Complete Equipment on New Maxwell Roadster

Many refinements and appointments characterize the new Maxwell sport roadster, mention of which was made in last week's issue in connection with the description and illustration of the sport touring.

Upholstery is long grained patent leather and the top material is olive-drab duck two ply, with rubber insert. Other features include a radiator, parking lamps and headlamps, all finished in full nickel. The price of the roadster is $960.



The Mason Road King Speed Truck

A 1-ton speed truck has been developed by the Mason Motor Truck Co., a subsidiary of Durant Motors, Inc., and will be marketed under the trade name Mason Road King. It has been designed to meet the general requirements of the speed truck field, that is to furnish rapid transportation at moderate cost for operation and maintenance.

The engine is a Hercules four-cylinder type of 4 in. bore and 5 in. stroke, and is rated at 35-40 hp. It is fitted with a 1¼ in. carbureter, which is supplied with fuel from a 12 gal. tank by gravity feed. The cylinders are block-cast, with a detachable head and an aluminum oil sump. Full electric equipment is provided, being of Auto-Lite make. A USL storage battery is included in the equipment. Lubrication of the engine is by pressure to the main bearings and by splash to interior parts. The cooling water is circulated by pump, the latter being provided with a "through" shaft for the generator drive.

ber and outside adjustment is employed. The gearset is a three-speed device of Warner manufacture and is separately

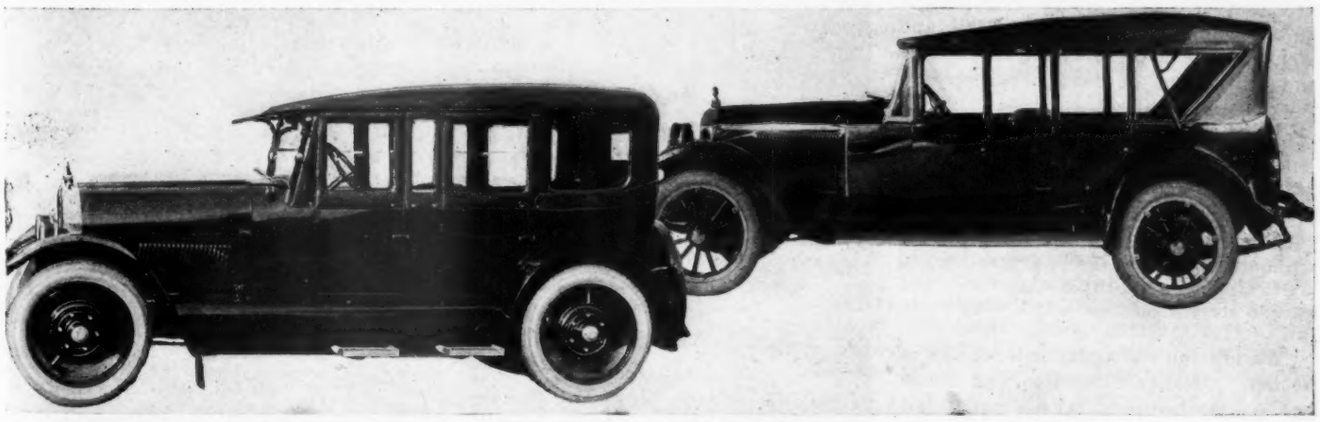
A plate clutch with light driven mem- mounted on the sub-frame. Between it and the clutch there is a Spicer double universal joint to take care of any misalignment between the engine and gearset bearings. The control lever for the gearset is mounted on the cover plate and the truck is therefore arranged for central control.

The rear system is of the torque arm type, comprising an exposed tubular propeller shaft with two Spicer universal joints. Final drive is by spiral bevel gears with a reduction ratio of 4 to 1, though a specially low reduction gear of 5.5 to 1 will be furnished for hilly countries, if desired. The rear axle is of the full floating type of built-up construction. The truck has a wheelbase of 130 in. and the standard 56 in. tread.

The frame is of pressed steel. Suspension is by half-elliptic springs all round, the front springs being 38 in. long and 2 in. wide and the rear springs, 40 in. long and 2½ in. wide. Driving thrust is taken up on the rear springs. The wheels are of the wood type, fitted with demountable rims and 34x5 in. pneumatic tire all around. Both sets of brakes act on drums on the rear wheels, which drums are 14 in. in diameter and have a width of braking surface of 2¾ in. The outside or contracting brakes are the service brakes.

A number of body types will be standardized, including a stake body and an open express body. The truck chassis, with cab but without body, weighs 3320 lbs. The complete truck with stake body weighs 3950 lbs. and with box body 3690 lbs. The cab furnished has sliding curtain doors with celluloid windows that can be quickly lowered or raised.

Chicago Distributors Convert Open Cars



Two more Chicago branches of automobile manufacturers have come forward with open cars converted into enclosed models through the medium of the winter top. They are the Byrd-Sykes Co., Paige distributors and the Haynes company's office. The Paige models have improved somewhat on their winter enclosure and the model shown at the right sells delivered in Chicago for $2325. The Haynes company uses a top, left, manufactured by the Rex Co. and sells for $875, this price including Disteel wheels. Both agencies report sales of the phaeton-enclosed type as excellent

A Dealer Who Doesn't Know How to "Quit"

Never Say a Thing Can't Be Done. Go Out and Do It, If You Have to Do It Yourself

"CHARLEY HENSHAW is usually two jumps ahead of the procession; he is planning today for what he is going to do three or six months from now."

That is the way one Boston automobile dealer spoke some time ago when discussing successful men in the motor trade, and Henshaw's name came up. Everyone acknowledges Henshaw's success, for he presides over a big salesroom on Commonwealth avenue, a large service station on another street, an organization running into three figures, several sub-dealers, and all this developed from a start, a few years ago, with a small room and a stenographer. Tribute from another dealer is worth while. Continuing, the man said:

A Competitor's Opinion

"Henshaw never knows when to quit. Put something up to him and tell him it cannot be done and watch him go to it. I know, because I have been with him and seen him working all the time.

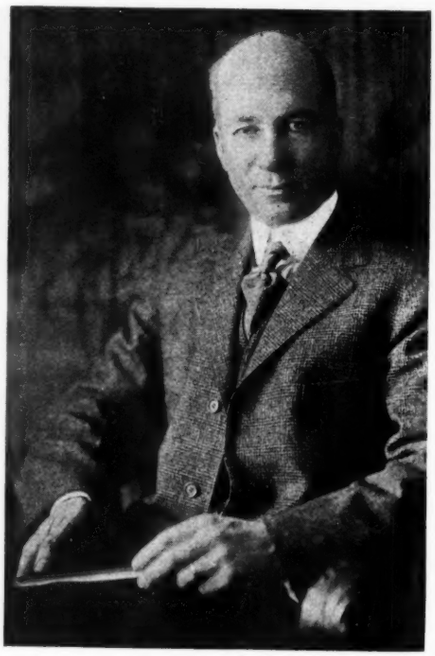
"Remember that famous Dodge Brothers parade of cars on the anniversary of the opening of the agency? One of Henshaw's men went to the City Hall to get a parade permit. It was to go downtown in the business section, where they don't favor parades because of the narrow streets and the resultant blocking of traffic. Henshaw's heart was set on the parade, for he had invited many owners to join and bought high class prizes for specially decorated cars.

"The request was turned down flat. Many of them are. Henshaw was disappointed, but not dismayed. He jumped into a car and hustled downtown to a friend who knows about everyone in town. They went to the City Hall, and Henshaw got a personal introduction to the chairman of the Board of Street Commissioners, outlined his plan and GOT HIS PERMIT.

He Goes to Headquarters

"Ten minutes before the parade was to start he found another permit was necessary from the police to form the parade without violating the parking rules. Quick telephoning lifted that ban; the parade started on time and it was a big hit.

"Washington's Birthday is a big day in Boston. Henshaw celebrates with music and special features. A few years ago he had some moving pictures for display, showing Dodge cars in some wonderful climbs. A booth was erected and everything in readiness for the holiday. Then a movie operator was engaged. He went



Charley Henshaw, the Boston dealer who never learned the word "can't"

up the day before, looked the place over and asked where the permit was for the exhibition. There was none.

A call to City Hall brought an inspector, who said he would not approve the request. The commissioner said nothing doing, as they discouraged permits for moving pictures in salesrooms, even though Henshaw's was fireproof, and easy to get out in case of fire. Henshaw sped downtown about 3, through a friend saw the Mayor, explained the situation, and GOT A PERSONALLY SIGNED PERMIT by that official, the last thing the Mayor did that day. And this show was a big success.

Frankness Gets Results

"Another time a question arose about changes in his new salesroom, under construction. They were technical, perhaps, but the city inspector and the contractor could not agree, each believing the other was trying to slip something over, and there was a delay. Henshaw wanted to get in quick, the new layout being better suited to his purposes. Henshaw rolled downtown again. He took the plans along and got a friend to introduce him to the Building Commissioner. They went over the whole situation in a few minutes, the commissioner put his initials and O. K. on the plans. WORK WAS SPEEDILY RESUMED.

No Special Favors Asked

"Now in all these things there was no suggestion of graft, not even the passing of cigars. The city officials were told the stories frankly, and without suggestion that they were being asked to grant special favors. It simply meant, on Henshaw's part, searching out ways and means personally. Naturally, he is successful, for he plans all his work along the line of always finding the right way to get a thing done and then going right after it."

This shownroom is only a part of the business establishment that has been built by Henshaw's "Go Get It" methods

An Ideal Electrical Service Station in the Making. No. 6

Making an Armature Tester That Works on the Millivoltmeter principle

THE use of a voltmeter or millivoltmeter in checking armatures is based on comparing the resistance by means of current sent through the armature. For example in Fig. 1 we have a simple armature, the one shown having ten commutator segments and ten coils, although the armatures usually encountered have more. As shown in this sketch, we have arranged to send current from a battery through the armature by means of contacts placed at the normal brush positions.

While the armature in Fig. 1 is very simple, it has circuits similar to the more complicated windings, and in tracing from the brush at the left to the one at the right we can go either through the coils connecting bars, 1, 2, 3, 4, 5 and 6 or we can trace from 1 to 6 through the coils that connect bars 1, 10, 9, 8, 7 to 6. With two paths through the armature the current will split up and half go each way, if the coils are all alike. The rheostat or variable resistance is used to vary the current sent out by the battery, and is needed because all armatures are not alike; some have fairly large wire, while others have comparatively small wire.

Now this current, in going through the various coils in the upper and lower circuit of the armature, will have to overcome the resistance of the various coils through which it passes and in so doing will lose some pressure, which electrically we call voltage. This being the case, we can use a pressure gage, which electrically is our voltmeter to measure this loss. As this voltage or electrical pressure is usually a small quantity, we find that we really need a meter capable of measuring in thousandths of volts and as milli means one thousandth we use this kind of a meter. When it reads 10 it means .010 volts.

Now suppose that in Fig. 1 we have a perfect armature, that is, one in which all coils are alike, the soldering to the commutator bars is secure, and the insulation of the wire is not broken or rubbed so that there are no short circuits in the winding. We will now assume that we have allowed the battery current to flow and have found that the voltage drop or loss across bars 3 and 4 is so much that our millivoltmeter needle is knocked off the scale. To correct this condition, we move the contact arm on the rheostat along so as to reduce the current and we find that the millivoltmeter reading drops accordingly and we are able to get a reading.

We will now turn the armature so that the brushes or contacts rest on bars 2 and 7 and we get the voltage across bars 4 and 5. If the coils are all alike this reading should be exactly the same as the first one, and so it should go all around the armature. In practice, however, it will be found that even with a good armature there will be slight variations, due to the fact that even the same girl in the winding department of a large electrical concern, turning out hundreds of coils a day will never turn out two exactly alike. However, if we should get a reading that is much lower or higher than the average reading, we know that there is some unusual condition present.

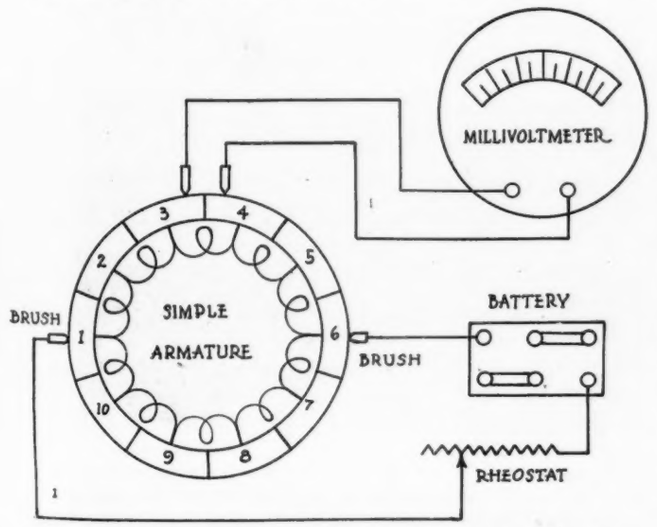


Fig. 1. Application of the Millivoltmeter Test to a simple armature

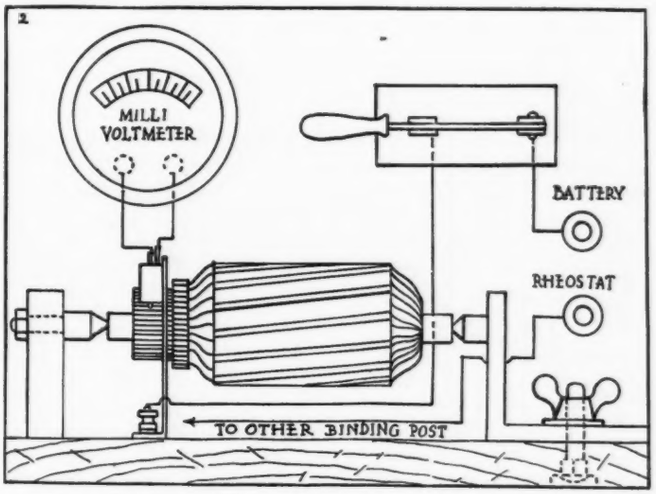


Fig. 2. Easily constructed armature tester

What a Short Does

Suppose for example that between the bars 3 and 4 a piece of metal should become wedged so that 3 and 4 were connected by metal of very low resistance. We would then find that the current going from bar 1 to bar 6, through the upper half of the armature, would find it comparatively easy to get from bar 3 to bar 4 and would therefore, lose but little of its voltage at this point. We would get a very low reading on our millivoltmeter if bars 3 and 4 are shorted. A LOW READING THEREFORE MEANS A SHORT CIRCUIT.

What an Open Does

Now suppose that instead of a short circuit between bars 3 and 4, or any pair of bars, there is an open circuit, due either to a wire being broken or due to being poorly soldered at a commutator bar. We would then have current flowing from bar 1 to 6 through the lower half of the armature but not through the upper half. The left contact of our millivoltmeter is then connected through the coils from 3 to 2 and from 2 to 1 over to the contact at bar 1.

On the other hand, the right contact of our millivoltmeter is connected, through the winding between bars 4 and 5 and 5 and 6, to the right contact at bar 6. In other words, the testing meter, instead of being connected so as to read the loss of voltage across one armature bar, is connected so as to read the voltage across the whole armature. This will give an abnormally high reading, or may bang the needle off the scale. A HIGH READING THEREFORE MEANS AN OPEN CIRCUIT.

Making the Armature Tester

An armature tester of this type is not very difficult to make, although it may not have as good appearance when finished as if it had been purchased from some supply house. In Fig. 2 is

shown an arrangement of parts, whereby the armature is held on centers, much as it would be in a lathe. One or both of the centers are adjustable, so as to accommodate armatures of varying length, and a contact holder is shown straddling the commutator. The detail of this contact holder is shown in Fig. 3.

As shown in Fig. 3 the contact holder is made of two flat strips of metal bent edgewise or else cut to this shape from sheet metal, but these strips do not meet. At the top of the arch is an insulating block, which can be made of wood or fibre, and it supports two adjustable contacts which will serve as the connections for the millivoltmeter. The upper portions of the metal strips are bent so as to form a support for the fibre block and short screws make the three pieces into one assembly.

Two other adjustable contacts are shown, one being mounted in each of the metal strips, and as indicated they can be swung around so as to be opposite one another or can be at 90 degrees, as shown. This is desirable for the purpose of properly testing both two and four pole armatures. As shown, the main contacts are about right for testing an armature from a four pole machine. For a two pole job they should both be moved to the bottom of their respective slots. Binding posts at the foot of the metal strips not only hold them to the wood base but serve for making connections.

Referring again to Fig. 2, we see that the two upper contacts of the contact holder connect direct to the millivoltmeter, while the two binding posts at the foot of the contact holder connect, one to the switch and the other to one of the binding posts. Then when the battery and rheostat are connected, as shown in the general diagram of Fig. 1, we have a practical tester ready to use.

A millivoltmeter may be purchased or may be made from an old ammeter, of the type that has a moving coil. Ammeters of this kind have a shunt or heavy metal connection from one terminal to the other, while the fine winding of the coil is also connected across the terminals. By sawing the shunt in two, all of the current to the meter will have to go through the coil, which will make a very delicate meter of it. It may not read exactly in millivolts, but will give comparative readings that will do just as well.

Where Equipment Makes Money

Investigation of electrical service stations will reveal the fact that many of them are barely able to exist, and few are really making a respectable profit, in spite of the fact that considerable technical knowledge is required for repair work of this kind. This seems to be due, moreover, not to lack of business, but to inability to properly handle it after it is once inside the shop.

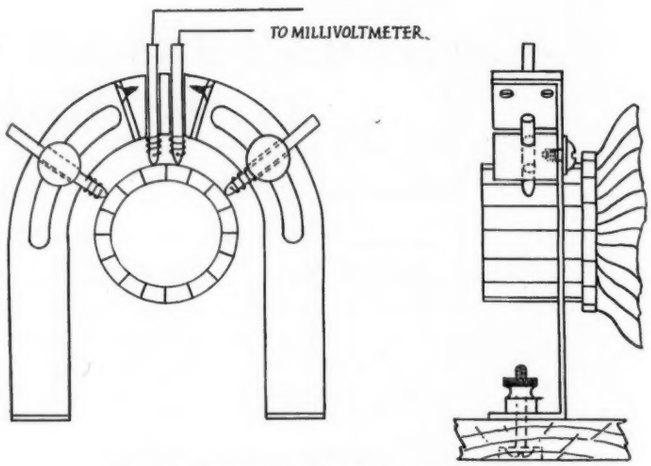


Fig. 3. Contact holder for armature tester

One difficulty seems to be in impressing the customer with the fact that a real job has been done when illusive shorts in the car wiring or the generator have been located and repaired. The customer may say, "Oh, just a broken wire, was it, I could have fixed that." And he does not feel that the job is worth much, because he does not realize the years of study and training that are represented by the ability to locate trouble of this nature.

It is for this reason that impressive equipment plays such an important part in the financial success of the electrical station, for it is something the customer can see and appreciate and seems to justify his paying a fair price for the work that is done on his car. Although home made apparatus will do the work, it does not make quite the impression that it should on the customer, and while it enables the shop to get by for the time being, the time soon comes when it is due to be replaced. The progressive shop manager will therefore add reliable standard testing equipment as fast as he can afford to do so, and will find that it pays big dividends.

An Ideal Stockroom Arrangement

The C. W. McCabe Company, Dodge dealers in San Diego, Cal., have the reputation of maintaining one of the finest stock rooms in the West. This department has been so laid out that a customer in the entrance may be seen from almost any part of the room. The parts bins are so arranged as to make the handling of parts a simple and speedy matter. Cards on each bin contain the factory number of the part, a description of the article and the price. In some bins three different parts, more or less associated, are carried. Parts in greatest demand are carried in bins nearest the customer's window

Cleveland Service Men Exchange Ideas on Getting Winter Business

"GETTING and Holding Winter Business" was the subject under discussion at the meeting of the Service Division of the Cleveland Automobile Manufacturers and Dealers' Association, Nov. 14. The members submitted many ideas and suggestions and some presented letters which they are sending out to owners—all with the idea of enabling the dealer to get a stronger hold on winter business.

A Letter to Car Owners

One of the letters, which is being sent out by the Peerless representative, is reproduced on this page. The prize-winning merchandising and business-getting ideas which appeared in the Winter Business Number of Motor World were read and these, with the suggestions of the members, made the meeting a notable one in the way of procuring new merchandising thoughts and plans.

C. E. Houck (Auburn) said that his firm had sent letters to owners, asking them to come in for an inspection and overhauling which would prepare the car for winter driving. A special request was made to have radiator leaks repaired and alcohol put into the cooling system. A stated price was given to the owner for this operation but no charge was made for putting in the alcohol.

R. A. McGrath (Marmon) said that he believed the time to work for winter business was in the summer—that every car coming into the shop should be kept on record as to its condition and that by this system, it was possible to know which cars needed more attention than others.

Free Inspecton Service

He told of a free inspection service rendered owners, by his firm, making it possible for them to know at all times, if there is anything wrong with the car. In October, letters are sent out telling owners what the car needs for winter driving. In November, another letter follows on radiator covers and winter accessories. Salesmen are directed to visit owners and report on them to the maintenance division.

J. F. McDonald (Buick) presented what his firm terms a "Winter Warning" which is sent to owners just at the approach of cold weather. This is a circular which tells briefly what is to be done to the car to keep it in good running condition in the winter. Instructions are given, first on oil, stressing the importance of using a slightly lighter body of oil and the necessity of changing it every 500 miles.

The cooling system is next commented upon. "See that you have no water leaks," reads the circular, "then drain the radiator and wash out the water system thoroughly. Refill radiator with clean, fresh water, then drain off sufficient water to add the amount of alcohol listed below, to prevent freezing."

A table follows, telling how much alcohol is needed in the various models of Buick cars, and finally, instructions for storage.

The letter sent out by the Peerless company gives information on anti-freeze solutions, exhaust valve heat, radiator cover, replacing oil, care of tires and quick starting.

Letters Like This Get Winter Business for Cleveland Dealers

Dear Sir:

The approach of cold weather prompts us to remind you that you should derive just as much pleasure and comfort from your Peerless in the winter months as in the warm days of summer.

The Peerless is an all-year car, built to give you year-round service. If you will carefully attend to the following details, your car will continue to render you maximum service and comfort even on the coldest days.

EXHAUST HEAT VALVE. There is an exhaust heat valve in the top of the right side of the intake manifold, put there for the purpose of checking heat or supplying heat to the intake manifold. During the summer this valve should be kept closed. Open it now, and the exhaust heat from the exhaust manifold will pass around the jacket surrounding the intake manifold, thus helping to vaporize the gasoline and produce normal running conditions in a short time.

ANTI-FREEZE SOLUTION. Add denatured alcohol to the cooling system, as described in the Peerless Instruction Book. Evaporation will take place quite rapidly and you should take care that the proper proportion of alcohol is maintained at all times. Do not use a solution of calcium chloride or any alkaline solution, as these are injurious to the metal parts.

RADIATOR COVER. Provide a suitable radiator cover with adjustable opening. It is not necessary nor is it recommended that you cover the entire hood during the winter; if you do, you will undoubtedly find that your hood will need refinishing in the spring. If the weather moderates while you are using a radiator cover, you must guard against over-heating; your motometer is an excellent gage of engine heat and by watching it closely you can guard against over-heating the engine.

REPLACE ENGINE OIL FREQUENTLY. During cold weather, water and gasoline may accumulate in the crankcase of the engine. It is necessary to drain and clean the oil pan more frequently than during warm weather, and it is recommended that the oil be drained every 350 miles, if the car is constantly making short trips.

LUBRICATION. As the entire mechanism of the car is subjected to more severe usage in the winter time, you should see that the various parts are well lubricated, especially the brakes and steering mechanism.

CARE OF TIRES. Small holes in tires will quickly cause trouble in winter, on account of mud and water accumulating, freezing and expanding. Your tires should be frequently inspected, and such holes and cuts immediately repaired.

QUICK STARTING. First, release the clutch; this relieves the battery from the added strain of turning the jack-shaft in the transmission case. Second, pull out air button marked "A", not quite as far as it will go. Third, switch ignition to battery position. Fourth, press starting button. Fifth, as soon as engine begins to revolve, pull out the priming button, marked "P", all the way, and quickly let it snap back to its normal position; repeat this priming operation if necessary, but be careful in using the primer, because too much gasoline in priming will enrich the mixture to the point where the engine will actually fail to fire from this cause. Sixth, when the engine is running free, engage the clutch. Seventh, gradually push down the air button "A", as the warming-up progresses.

While these precautions and suggestions seem long in telling, they are really simple processes that may be performed in a short time. Their purpose, in the main, is to reproduce summer conditions under the hood by means of utilizing the heat generated by an engine in operation.

Please bear in mind that we are always vitally concerned in helping to keep your Peerless running satisfactorily at all times, and when you are in any doubt or difficulty you need only call our Service Station.

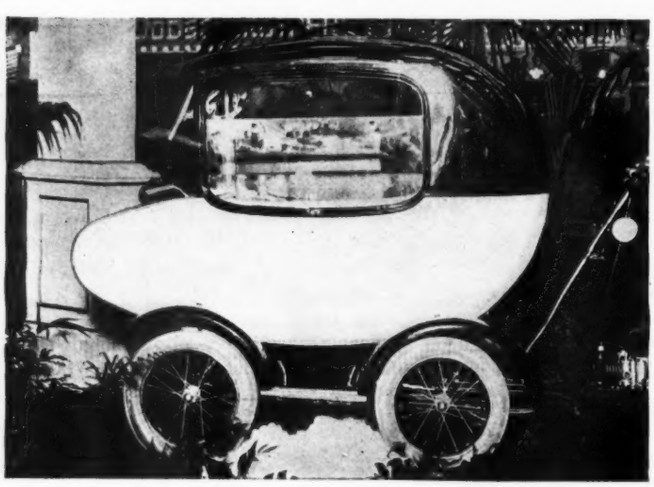
Yours very truly,

THE PEERLESS MOTOR CAR COMPANY.

MOTOR AGE'S PICTURE PAGES

The Bureau of Public Roads is about to tell us what causes the humps and waves in bituminous roads and pavements. A circular track has been designed on which will be run specially designed cars and trucks. These vehicles carry no driver. The small electric car carries four rubber tired truck wheels that run on a narrow concrete roadway made of compositions which vary in nature. The electric car runs at speeds of 20 miles per hour and the trucks at 12. Instruments record the distance travelled. The electric car shows the causes of wear on the road surface and the truck the causes for wave formation

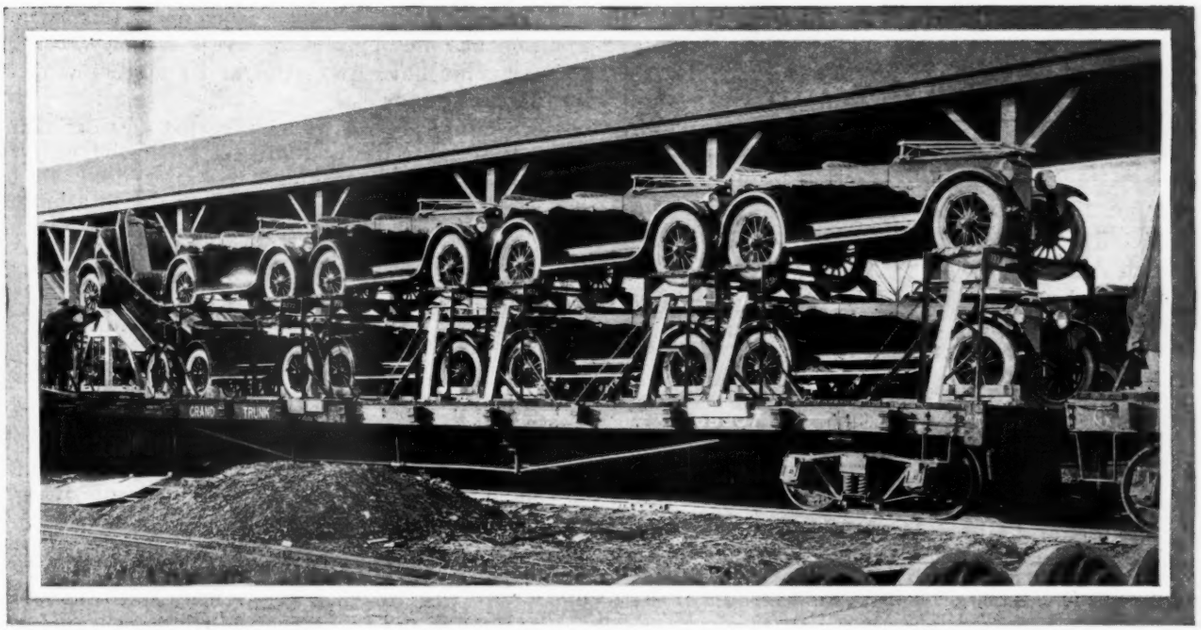
The automobile played an important role in the great demonstration which resulted in the overthrow of the facta government of Italy. Here are women members of the Fascisti



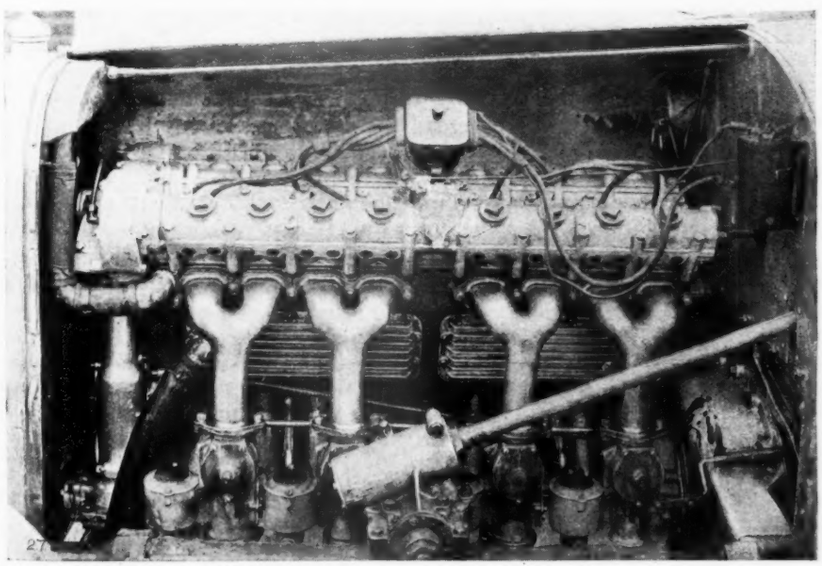
Even the baby is going to ride in a motor-driven vehicle. The London show displayed a motor-driven perambulator, operated by the nurse-driver, who stands on a platform at the rear

The strong appeal of motoring to women is nothing new, as shown by this advertisement of the Packard company 17 years ago. An enlarged reproduction of this advertisement has recently appeared in the show windows of Packard salesrooms

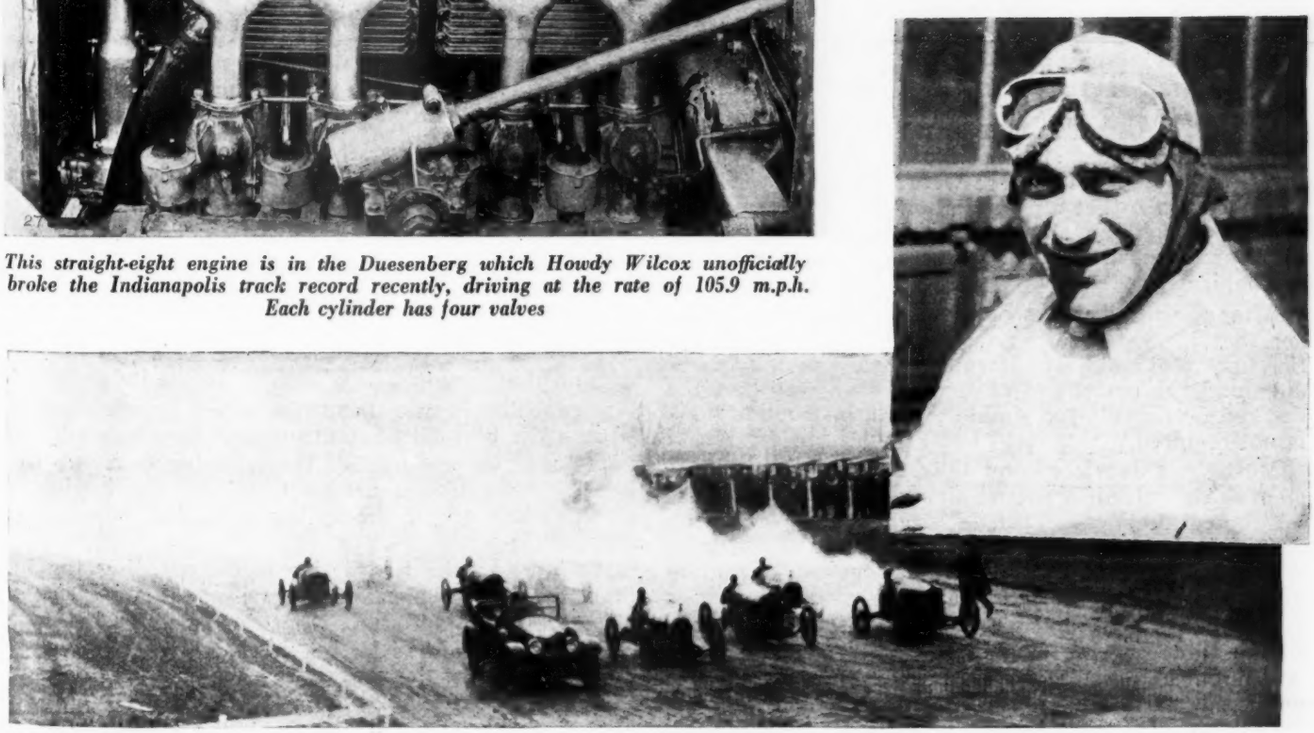
OF AUTOMOTIVE INTEREST



By means of a steel deck spiked tightly to a flat car, the Buick Motor Co. has been enabled to ship two tiers, or nine automobiles per flat car. The automobiles are loaded and unloaded by means of a large wooden frame fitted to the main deck of the freight car and to which pulley and chains are adjusted for lifting and lowering the merchandise



This straight-eight engine is in the Duesenberg which Howdy Wilcox unofficially broke the Indianapolis track record recently, driving at the rate of 105.9 m.p.h. Each cylinder has four valves



Besides the famous brick oval, Indianapolis has a new dirt track opened on Armistice day. Ralph Ormsby won the race. Here the cars are shown bunched on a turn, which always offers a thrill on dirt tracks. Ormsby is shown in the insert

MOTOR AGE

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The Wonder Car

A WOMAN called MOTOR AGE a few days ago and reported that she had recently bought a motor car and that for three weeks she had been after the salesman to get an instruction book. She wanted to learn something about this piece of machinery she had purchased and which was a mystery to her in a mechanical way.

After the three weeks of requests the salesman told her that he had inquired at the office for an instruction book and had been informed that the manufacturer did not issue one. The reason, he said, was that the car had been made "so simple that an instruction book is not required."

MOTOR AGE does not know the facts behind this statement of the salesman but we sincerely hope that he has misquoted the dealer, the factory or some one who might speak with more authority regarding the instruction book. Certainly there is no car manufactured today that is so simple that a woman who has never owned a car before, but who paid a dealer cash for the one she now owns, can understand it.

It might be possible that from an engineering standpoint, this particular motor car is quite simple but it is very doubtful if there is any one engineer in the entire industry who could answer off hand all of the questions that might be asked him by an owner concerning it. It happens that this motor car has an engine that has been on the market less than a year and few maintenance men know it thoroughly. According to this owner, the maintenance men employed by the dealer who sold her this machine have disagreed as to a certain operation on the car already.

It certainly is a great mistake for any car manufacturer to assume the attitude set forth above. We believe that the manufacturer has not done so but it would be well to supply he salesmen with a better line of talk to repeat to the owners.

The ten million car owners represent 95 *per cent of the entire wealth of the country.*—SHERMAN.

Tires

IT is a bit unfortunate that the present wave of looking for some ready made means of improving business conditions has become so prevalent. Some years ago everybody was buying patent medicine for every ill and the doctors' business appeared to be confined almost exclusively to surgical cases and sitting at the bedside of the patient who had complicated a more or less slight ailment by the wholesale taking of a nostrum supposed to cure almost anything.

These remarks are prompted by some recent developments in the tire field. Far be it from MOTOR AGE to discourage in any way dealer association activities, but one can hardly read the program and resolutions of the recent convention of the National Tire Dealers' Association without feeling a bit of discouragement. This association is composed of a small number of earnest men who have undertaken a great big job and their public announcements this year are somewhat along the line of their previous announcements.

Practically all of the issues raised are a reflection on the manufacturers' practices. MOTOR AGE holds no brief for the tire manufacturers, but we do believe that there are some bad merchandising practices existing today among the retailers of tires. We believe that the N. A. T. D. would be in a much stronger position if, for the present, the effort was made toward cleaning house in the retail field.

Suppose, for instance, this association had pledged to begin a campaign of education among all retail tire dealers for a better understanding of practices necessary for the profitable conduct of a retail business and the listing of all retail tire dealer failures with the reason why this firm failed. Then the tire manufacturer would have believed that this Association was in earnest and that it would be of service to the industry.

It probably is true that to become a business attractive to the best talent, there should be a more liberal adjustment on the part of the manufacturer, and perhaps a more liberal arrangement for the buying of stock in winter for the spring rush, but who knows that this is true.

As long as the tire dealer is disregarding the list price of his merchandise and selling at any price to meet fancied competition, what good will a larger percentage do him? Is he not likely to make merely a deeper cut below the suggested price of a tire?

One of the leaders in the N. A. T. D. told, in a private conversation in Milwaukee during the convention, how he had been forced into some especially heavy

price cutting by a large customer who told him of offers to sell him tires by a merchant in another part of the city. Both of these dealers belonged to the local association but the man who met the price cuts did not call his competitor to learn if this customer was telling the truth. Was the manufacturer to blame because this man did not make money on these tires?

We believe that in the tire business there exists bad business practices on both sides of the fence. Also we believe that there are both dealers and manufacturers who are striving to better conditions. The way to better conditions is a very broad path and plainly visible. Let the good manufacturers and the good dealers find each other, trade with each other and we predict that the gyps on both sides will soon cheat each other out of a living by losing the confidence of the public.

Ask them to buy the things they ought to have.—SHERMAN.

Used Cars and Repainting

THE popular touring season is passed and the selling of automobiles has become more of a settled business than it was a few weeks ago. Especially is this true of the used cars. There was a very lively sale of used cars during the past summer to persons who felt that they could not afford to buy a new car and maintain it during the entire year. For vacation purposes they bought the cheapest car that would answer their purposes for a trip, used it for a few weeks and now that car is on the market again.

This feature of the trade has contributed to slow up used car sales in two ways. It has checked the sale and has added more cars of the lowest price and condition type to the stocks on hand. Consequently the used car situation again looks alarming to many merchants, who were inclined to think they were doing quite well earlier in the season. Most of these cars are quite disreputable in appearance, although some of them have very good transportation qualities. If properly dressed up, many of these cars would find a home with some of the many families that want an automobile.

The dressing up phase of the used car has been neglected. There is a serious lack of proper facilities for this work. In the main, automobile refinishing has been an "alley shop" proposition, without a definite scale of prices and without a program that would interest the dealer who has some used cars that need appearance more than mechanical work, to make them acceptable articles of sale. There are, of course, many entirely worthy body renewal plants but not enough of them.

There came into the MOTOR AGE office the other day a man who is manager and part owner of three successful body renewal plants in three large cities. In telling the story of his business, he related the mistakes that he had made in gathering the material and equipment for these shops and said that it was so discouraging to him in the first days that he almost gave up and he did not wonder that many men who started in this business did give it up.

This man was wondering how many men there are in the country who would like to own a body renewal plant and would be willing to pay an advisor a small fee to help him get started in a profitable business. This man said that a shop, for metal plating, enameling, trimming and painting at the rate of three cars a day, could be installed for $4,000. Such a shop would employ about 25 men and could make prices on repainting jobs that have proven surprising where only the older type of shops have been doing the work.

It was also suggested that such a shop should not be conducted in connection with a dealer establishment, but should be free from trade alliances and should look entirely to dealers as the source of its custom. Naturally much of the work would be done for car owners who wish to avoid selling their cars, but usually these owners talk the matter over with their dealer first and in this way are recommended to a shop like this one, which will turn out satisfactory work at a satisfactory price.

The renewal of automobile bodies has been seriously neglected, but from several points there are coming signs of appreciation of the great field that is open here. In several smaller cities dealers are contemplating stock companies to finance such an institution, with all dealers holding some stock.

How many are interested in such a proposal?

What betters the condition of one man betters the condition of the entire industry.—SHERMAN.

Exit Winter Driving Fear

THE service division of the Cleveland Dealers' Association meets regularly to discuss problems of maintenance. They express their views on winter service and recently exchanged experiences with a plan of circularizing owners which they have put into effect in their establishments. They are unanimous in the belief that the best way to get the car owner to drive during the winter and consequently keep the shop busy, is to educate him to the needs of a car in winter.

The "winter driving scare," which is gradually disappearing from the ranks of owners can be done away with entirely if dealers will just realize that a car can be operated as successfully in cold weather as in warm, with but a few changes in the practices of the driver. These changes, chiefly regarding oil, water and alcohol, can be told to owners by advertising and letters.

A story is told about a young man who entered the office of a large car manufacturer and asked for the agency of that car in a remote part of North Dakota where an automobile had never been sold because no one would take the agency. At first the manufacturer refused, but the young man persisted, bought several cars and had them shipped to his town.

In the Spring it was found that he had sold more cars than any dealer in the northern states. When asked how he had overcome the "winter scare," especially up in the Dakotas where "hot water freezes so fast that the ice is warm," he said simply, "It was easy. People up there didn't know anything about a car not operating in winter, and, with a little instruction from me, they were able to travel every day except when the snow was too deep. They were never the victims of this untrue propaganda which has made city people believe they must store the cars in winter."

The Cleveland men seem to be of the same opinion as this man only they have the effects of the "untrue propaganda" to overcome. To this end, they are industriously sending out letters, circulars and advertisements.

All Production Records Are Broken

Industry Enters December After Greatest Period Known

Eleven Months of 1922 Expected to Show Excess of 100,000 Over Total for 1920

NEW YORK, Nov. 27—The automotive industry will enter December with all records in its production history broken. The eleven months period of 1922 is expected to show an excess of approximately 100,000 cars and trucks over the output for all of 1920 which established a record not surpassed up to this time. Estimating the November output at 200,000 at least, the aggregate for the eleven months will reach 2,313,000 compared with the 1920 total of 2,205,000. Based on this estimate the production for the full year will closely approach, if it does not reach, 2,500,000.

There is no apparent let up in demand. Shifting of sales efforts from sections where there has been a slight decline to districts where interest is keeping to a high level has equalized sales so that a good general average is being maintained. None of the major operating companies have tapered off their production schedules, with output centering around the closed car. The demand continues strong for this type, although there is evidence of renewed activity in sections where the open car carries a special appeal.

Conditions in South Good

On the Pacific Coast and in the South, conditions are particularly encouraging. High prices for cotton and other farm products in the southern states have been accompanied by a growing demand for cars which is making this section one of the most attractive in the sales field.

While dealers have not yet made serious efforts toward stocking up cars, there is a trend in this direction to prevent a possible shortage in the spring. This movement probably will take more definite shape as soon as transportation facilities can be diverted from immediate needs.

No improvement is noted in the rail situation. Deliveries of cars are still behind and greater difficulty is being experienced in getting through steel shipments from producing centers. The lack of adequate shipping facilities, aggravated by the approaching season for the closing of navigation on the Great Lakes, continues to be one of the chief obstacles confronting the industry.

Trucks are moving forward steadily in production, light delivery vehicles meeting with the greatest popularity. Conditions in this branch of the industry are showing marked improvement. Tire manufacturers are moving toward increased output, to establish stocks of the finished products. Parts makers report conditions excellent with orders booked far in excess of their expectations for this season.

While the fuel situation has eased greatly, there is still a lack of bituminous coal, which calls for the greatest economy in its use, but this shortage is not so serious as to cause concern.

20 Louisville Dealers Stage Enclosed Car Show in Stores

LOUISVILLE, Ky., Nov. 25—Twenty members of the Louisville Automobile Dealers' Association staged special displays of enclosed cars in their salesrooms this week. Decorations in the way of autumn leaves and branches were used in many of the showrooms. Emphasis was placed on the demonstration and explaining of enclosed car advantages rather than sales during this week, so that visitors to the various automobile establishments felt free to call and inspect models on display.

Large beaverboard signs, bearing the lettering, "Enclosed Car Week, November 20-25," together with the name of the car handled and the membership emblem of the association, were in place before the various automobile showrooms of dealers participating.

ALL CADILLAC MODELS REDUCED

DETROIT, Nov. 25—Cadillac Motor Car Co. has made reductions of $215 to $265 on open styles and from $150 to $260 on enclosed models, the new prices to become effective Dec. 1. The new prices are declared by President H. H. Rice to be the result of largely increased business during the year, and to anticipations of still further increases in 1923. In connection with the price change, the company declares that the type 61 will be continued without change.

The new and former prices are as follows:

	Old Price	New Price
Roadster	$3100	$2885
Phaeton	3150	2885
Touring	3150	2885
Coupe (5-pass.)	3925	3750
Victoria	3875	3675
Sedan	4100	3950
Suburban	4250	3990
Limousine	4550	4300
Imperial Limousine	4600	4400

RYAN OUT OF BANKRUPTCY

NEW YORK, Nov. 25—Allan A. Ryan, formerly in control of the Stutz company, who failed for $18,000,000 last July, has been discharged from bankruptcy by Justice A. N. Hand of the Federal District Court. Of the unsecured indebtedness of $4,000,000 the wife of the bankrupt held a claim of $2,000,000, which has been waived, and it is said the holders of the other claims of the remaining $2,000,000 will receive nothing.

November Sales Abreast of Previous Wisconsin Figures

Number of Cars Sold Is Less Than October but Money Is Even

MILWAUKEE, Wis., Nov. 27—It is a source of wonderment that the retail movement of passenger cars throughout November is so active as it has proved to be. While not approaching the record demand of May and June, the sales volume has held its own with September and October in a dollars-and-cents way, although perhaps the number of cars sold was somewhat smaller. This is due to the fact that the demand in the past month has been principally for enclosed types and sport models, which command premiums and thus sustain the money volume of trade.

Some dealers say that if it were so easy to get delivery of closed cars and sport types as it is to get roadsters and phaetons, they would feel that they had little trouble to contend with. The scarcity of coupes and sedans is actually acting as a check on selling, for prospective buyers are inclined to be very insistent upon getting their cars right away. At the same time, local dealers continue to book satisfactory orders for delivery as quickly as possible. Customers are not doing as much shopping as last spring. A majority have made up their minds on the make of car and do not rush to a competitor to buy his make, even if the competitor is able to place a car in hand immediately.

Dealers here are encountering the usual late fall and early winter demand for cars for spring delivery, which in many cases involves the taking in of a used car now and letting the credit ride until March or April. This custom is more prevalent than in former years and has added somewhat to the used car problem of dealers, for it is usually found that the beginning of winter is not the best time of the year in which to turn over used stock.

Some good sales of the higher priced cars in sedan and limousine models are being made to families of means, adding to the money volume of retail trade to offset the car volume decline. Pierce-Arrow, Packard, Lincoln, LaFayette, Cadillac, Peerless, Marmon and other dealers here report a very substantial volume of enclosed car business in November.

TO MAKE NEW DISK WHEEL

BUFFALO, Nov. 25—Announcement is made that the Wire Wheel Corp. of America will produce and market a new steel disk wheel, which will be called the Buffalo. Mechanical features of the wheel will not be announced until the national shows.

"Human Exhibits" Used to Illustrate Sales Talk at Philadelphia Meeting

New Officers Elected by Accessory Men's Association—Metcalf Resigns to Take Seat in Legislature; Two Judges Talk on Courts

PHILADELPHIA, Nov. 25—"Human Exhibits," the excitement attendant upon the election of a new set of officers and directors and a good dinner were among the factors contributing to the entertainment of the members of the Automobile Accessories Business Association and their guests, at the November meeting, held at the rooms of the Philadelphia Automobile Trade Association.

The "Human Exhibits" were three prominent members of the association selected by one of the speakers of the evenings, who indicated them as embodiments of the three representative types of prospects met with in automotive salesrooms, namely, the mental type, the motive type and the vital type.

President W. Howard Metcalf, head of the association for the last four years, retiring because of his recent election as a member of the State Legislature, presided. The election of officers and directors resulted as follows: President, Guy S. Lane; vice-president, Ralph J. Cahall; secretary, N. A. Petry, and treasurer, R. A. Harp. Directors—W. Howard Metcalf, John Monahan, A. W. Stellwag, C. H. Walz and J. M. Willitts. These will serve one year.

It was Gordon J. A. Hargraves who designated W. Howard Metcalf, Guy S. Lane and W. A. Jones, of Mount Holly, N. J., as the "Human Exhibits," asking them to take front seats. Hargraves is head of the Hargraves Selling System, New York, and a business counselor. His subject was "Scientific Salesmanship," and the burden of it was that salesmanship of the right sort consists in studying of human nature and then acting on the information. Selecting Metcalf, the speaker declared that he was of the mental type and should such a prospect enter the automobile salesroom, the argument should be along the lines of interesting him especially in the construction of the car and the excellence of its mechanism and how it coordinates.

Indicating Lane, who is large and energetic, the speaker said:

"To sell a car to this motive type, I would lift the hood and show him the motor; emphasize the speed of the car and demonstrate that it was calculated to carry him far, at a rapid rate, without undue wear, or tear."

Turning to Jones, who is stout and florid, Hargraves said:

"I would attempt to sell this vital type on the basis of how comfortable the car cushions are and how smoothly it runs." His audience agreed with him on all particulars. Jones admitted that he was so impressed by the comfort of a car himself, that only recently he had sold a car to a prospect on the basis of luxurious cushions and easy riding facilities alone.

Judge William M. Lewis, of the Municipal Court, addressed the gathering on how business men should take a deeper interest in the business of the courts and their functioning. At the conclusion of his address it was unanimously voted that Judge Lewis be made an honorary member.

Martin D. Yerkes, Millbourne, known extensively as "the fining 'squire'," because of his system of handling those motorists who, he believes, transgress the laws of his bailiwick, gave a good talk on the attempts of the authorities to curb those who insist on driving with their license tag hidden, or illegible, and those who are careless about having their front and rear lights on. He said that while there was a certain amount of over-speeding and general recklessness, most of the offenders were to be classed with those who hide their license tags and drive without lights.

Sherman to Show A. E. A. Films in South in December

CHICAGO, Nov. 27—An extensive merchandising tour through the South is planned for December by Ray W. Sherman, merchandising director of the Automotive Equipment Assn. "Ask 'Em to Buy" and "Shop Profits" films will be shown on this tour. The itinerary follows:

Dec. 11, Wilson, N. C.; Dec. 12, Durham, N. C.; Dec. 13, Winston-Salem, N. C.; Dec. 14, Morristown, Tenn.; Dec. 15, Chattanooga, Tenn.; Dec. 16, Atlanta, Ga.; Dec. 18, Macon, Ga.; Dec. 19, Columbus, Ga.; Dec. 20, Birmingham, Ala.; Dec. 21, Memphis, Tenn.

After the holidays Sherman will again go south, holding meetings in the following towns: Montgomery, Ala.; Jacksonville, Miami and Tampa, Fla.; Savannah, Ga.; and Charleston, Florence, Columbia, Spartanburg and Greenville, S. C. On Feb. 5 he will address a meeting at Winnepeg, Canada, and on Feb. 18 he will go to Oklahoma.

FORD OUTPUT AT MEMPHIS

MEMPHIS, Tenn., Nov. 25—October saw the Ford Motor Co., Memphis branch, build and deliver 5,588 cars, which is the largest output of the local plant in history. Over and above this the local plant carried 2,500 unfilled orders into the month of November. The new Memphis record was 100 cars better than the best previous month.

Sidewalk Traffic Rules Proposed for New York

Police Commissioner Believes Pedestrians Will Have to Be Regulated to Relieve Congestion

NEW YORK, Nov. 27—Traffic policemen on the sidewalks to control pedestrians and headlights for the officers are two sensational reforms being considered by Police Commissioner Enright in his efforts to solve the congestion problem which has so alarmed city officials. With this end in view he is drafting a set of sidewalk traffic rules which will apply only to pedestrians and which will be rigidly enforced, he says.

These are only two of the relief measures the commissioner has in mind. With New York doubling the number of its automobiles every three years, he realizes that drastic steps must be taken to make it possible for residents of the city to use the streets and sidewalks. So serious does he consider the situation that he says it may be necessary to eliminate the sidewalks on Fifth avenue and Broadway and give the whole width of the streets to vehicular traffic. To care for pedestrians he would build the sidewalks along the first floors of the stores and office buildings, which at the same time would permit the stores to display goods in an arcade effect.

Enright also suggests taking down the Second and Sixth avenue elevated lines and placing them underground with four tracks each. An elevated structure along West street, the most congested thoroughfare in the city, is favored. This, Enright thinks, should be at least 80 feet wide and extend from the Battery to 72d street, with runways that would connect West End avenue and Riverside drive with Broadway. A few of the cross streets, particularly those leading to the four bridges across East river, should be widened.

The pedestrian control idea seems to be the most practical one at the present time. Enright has given this considerable thought and as his plan is outlined, he would keep people moving and break up sidewalk groups. Persons persisting in standing and talking on the sidewalks may be handed a summons to appear in court the same as a motorist who now violates a traffic rule is treated.

Because of the number of traffic policemen who have been killed and injured by being struck by automobiles, Enright is considering equipping the traffic cop with a radiolite hat band or put an electric light on his cap. An electrically lighted baton is another idea. Having a high powered calcium light continually shine on the traffic cop at night, as is done in some of the smaller cities, is being considered. In the day time, Enright thinks, accidents may be avoided by placing the blue coat on an elevated platform, where he may be easily seen.

Los Angeles Show Is Best Ever Held; Many Models Shown

Attendance Reaches High Point; Tents Are Used to Exhibit Cars

LOS ANGELES, Nov. 27—From every viewpoint the Los Angeles automobile show, which closed Nov. 19, was the most successful ever held. Despite the fact that a fifty-cent admission fee was charged, the crowds were the largest on record. Four tents having an aggregate of 135,000 square feet of floor space proved inadequate. The attendance was so large that dealers said it was almost impossible to give prospective purchasers the attention they deserved. This handicap, however, did not prevent more actual orders being taken than in any previous event.

Forty-four passenger car dealers showed sixty-one different makes. Twelve truck dealers displayed fourteen makes, with a total of almost 300 vehicles exhibited. There were twenty-two 4-cyl., thirty-six 6-cyl., twelve 8-cyl., and one 12-cyl. types of engines.

The first showings of new models was much larger than is customary. New types of Chalmers, Hupmobile, Star, Barley, Durant, Jewett, Cleveland, Rolls-Royce, Rickenbacker, Earl, Peerless, Dort and Stearns made their first appearance before the public.

At the Los Angeles Show

In previous shows it has been thought necessary by the exhibitors to doll up their cars, but the special job was an exception this year. It is evident from this that the standard finish and equipment of stock cars now is satisfactory and the demand for specials has passed. Only a very few de luxe models appeared and in the main these were close to stock with the exception of extra equipment. More sport models than ever were to be seen.

The show was staged without the services of a professional promoter. A committee selected from the Motor Car Dealers Association had entire charge. Burt Roberts, executive secretary of the association, acted as manager. Space was sold at $1.00 per square foot. Fifty per cent of the profits will go to the association and the remainder refunded to members of the association in proportion to the amount of space they purchased.

France Imports 2139 Cars From U. S., Exports 195

PARIS, Nov. 8—(By mail)—France exported 10,112 automobiles having a value of 321,423,000 francs, during the first nine months of the present year. Compared with the corresponding period of last year, the values show a deficit of 82,487,000 francs. Great Britain continued to be the best client of France, with Belgium second and the United States sixth on the list. The following is the number of French automobiles exported to the various countries:

England	3,672
Belgium	2,709
Algeria	1,119
Switzerland	576
Morocco	228
U. S. A.	195
Germany	136
Japan	130
Indo-China	155
Tunisia	90
Other countries	1,102
Total	10,112

French automobile imports totalled 2,773 units during the first nine months of 1922, of which number 2,139 came from the United States, 423 from Italy, 115 from Belgium, 31 from England, and 65 from other countries.

22ND DETROIT SHOW

DETROIT, Nov. 27—The twenty-second annual show under the auspices of the Detroit Auto Dealers' Association will be held Jan. 20 to 27 in the new municipal garage building, where 100,000 sq. ft. of floor space will be available on the ground floor. Passenger cars, trucks and accessories will be exhibited. H. H. Shuart, manager of the dealers' association, will be in charge of the show.

TRANSPORT ASSOCIATION STARTS

NEW YORK, Nov. 27—The National Motor Transport Association, with headquarters in the Fisk building, 250 West 57th street, New York City, has been launched, with E. B. Burritt, for eight years secretary of the American Electric Railway Association, as the prime mover responsible for bringing together the bus interests. There is no connection with the trolley industry.

AUBURN LIGHT SIX

AUBURN, Ind., Nov. 25—The Auburn Automobile Co. announces that its new light six will be ready for exhibition at the New York automobile show and that it will be displayed at shows in other cities thereafter. Orders for spring delivery are being taken.

TIRE PLANT SHUTS DOWN

STAMFORD, Conn., Nov. 24—A shutdown of the Stamford plant of the Carlisle Tire Corp., was announced today, the company claiming a general slump in business due to the winter season, caused it.

George C. Scobie Elected to Presidency of Earl Motors

DETROIT, Nov. 27—George C. Scobie, vice-president and treasurer of Earl Motors, Inc., under the Earl regime, was elected president to succeed Clarence A. Earl, resigned. Scobie is a Jackson man, having served successively with Hayes Wheel Co. as auditor, controller, secretary and director, continuing in the latter capacity after joining Earl.

Before becoming identified with the Hayes company, Scobie was a member of the accounting staff of Price, Waterhouse & Co., and has a long financial and business experience. He became active in the Earl company together with other Jackson men early in the year when the company experienced financial difficulties. His placement as head of the company has created general satisfaction in Jackson.

Stalnaker, Earl Sales Manager

DETROIT, Nov. 27—W. E. Stalnaker has been named general sales manager of Earl Motors, Inc., by George C. Scobie, new president of the company. Stalnaker formerly was Chicago distributor of the Premier Motor Car Co., and also at one time vice-president and sales manager of the Pathfinder Company of Indianapolis. He has already assumed his new duties and is working out plans which will give Earl wider representation than it has ever before had.

Ford Plans Daily Output of 7000 Cars Next Spring

Says That Recent $50 Price Reduction Caused Company No Financial Loss

DETROIT, Nov. 27—Ford production next spring may run as high as between 7000 and 8000 cars a day as compared with the record-breaking 5380. At the present time Ford has more unfilled orders on hand than ever before in the history of the company, while the Lincoln plant is said to be booked for two years ahead and making money at the rate of $1,000,000 annually.

In an interview Ford declared that his cut of $50 a car on a production of 5000 cars daily, which represents a decrease in gross of $250,000 a day, has not resulted in financial loss and he referred to his unfilled orders as proof.

Ford plans are said to include operating the plant at capacity the year round, making cars principally in the second and third quarters and in the first and final quarter keeping busy with the manufacture of parts for stock and replacement.

Coal for blast furnaces is being obtained at the mines at an average of $4, while there is a proportionate saving made on steam coal. Ford believes these prices are the result of his closing his plants for four days.

Celebrates Twentieth "Birthday" as Cadillac Distributor

DENVER, Nov. 25—His twentieth "birthday" as Cadillac distributor for Colorado, Wyoming and Western Nebraska was celebrated recently by President R. R. Hall of the R. R. Hall Cadillac Co. with a three-day enclosed car show and a new-model parade, given proper pioneer emphasis by a one-cylinder model bottle in bond and then some, the same being of the rare and ancient vintage of 1906. This speedster of the good old days was driven by Hall himself, with three veteran employes of his sales and service departments as fellow passengers.

While twenty years' service marks a man as truly a pioneer in the automotive industry, it is still far more of a distinction to have handled only one make of car during that many years. Only seven Cadillac dealers in the entire United States share Mr. Hall's unique record of handling this make of car for twenty years, it is said.

GOOD ROADS FOR MISSISSIPPI

JACKSON, Miss., Nov. 27—The passing of the road amendment to the Mississippi constitution during the recent election is a cause for joy to automobile dealers throughout that state and in the cities surrounding that state, such as Memphis and New Orleans.

The results from the election showed that the amendment was passed by a vote of 5 to 1. It provides for the control of certain roads in the state by the state highway department for building and maintenance. It is estimated that in addition to the other results of this amendment that it will give the state $1,000,000 a year from the federal road funds, additional.

Alliance of Minneapolis Associations Completed

MINNEAPOLIS, Nov. 25—Formation of the Allied Automotive Industries of Minneapolis has been completed at a second meeting. The initial meeting was Oct. 17. Members of the board of trustees chosen are as follows:

At large—Frank L. Cochran of the Standard Oil Co., F. C. Moyer of the Goodyear Tire and Rubber Co., A. L. A. Spitler of the N. W. Oldsmobile Co., A. C. Reinhard of Reinhard Bros. Co., John Hancock of the Pure Oil Co., Joseph Donnelly of the Mack Truck Co.

Minneapolis Automobile Trade Association—Harvey E. Mack of the Harvey E. Mack Co., and William Eggleston of the N. W. Automobile Co.

Minneapolis Garage Men's Association—W. R. Vashro of the B. L. Eckes Co., W. J. Potts of the Potts Motor Co.. Tire Dealers' Association—Henry Alden of the Minneapolis Rubber Co. and E. E. Bullis of the Northern Tire Service Co.

Northwest Tractor Trade Association—W. R. Biggs of the Avery Co., and J. E. Gardner of the J. I. Case Threshing Machine Co.

Vehicle Men's Association—Roderick Ritzinger of the Wallis Coach and Carriage Co. and L. K. Ritchie of the Boyd Transfer & Storage Co.

"BOOSTER CLUB" HANDBOOK

BOSTON, Nov. 24—A "Booster" handbook has been issued by the Booster Club, N. E. No. 1, of which Thomas F. Wilson of the Apco Manufacturing Co. is president. The membership is composed of manufacturers' representatives calling on the automotive trade. There are clubs in Kansas City and Denver and other clubs are being organized in Chicago, Minneapolis, Dallas, San Francisco and Atlanta.

FLINT GROWS WITH BUICK

FLINT, Mich., Nov. 25—The twenty years' story of Buick, culminating in the record output of the last three months, is essentially the story of Flint, which has increased from a population of 13,000 in 1900 to 100,000 at the present time. It is estimated that more than one-half of these people are either employes of the Buick Motor Co. or are their dependents.

DRIVERS FINED FOR NOISES

CHICAGO, Nov. 25—Fines of $100 and costs were imposed upon five truck drivers in the special automobile traffic court for making unnecessary noises in the vicinity of hospitals. This resulted from the campaign inaugurated by the Health Commissioner to use of siren whistles and unnecessarily loud horns within the city limits.

Garage Owners' Association Asks Uniform Illinois Law

Difference in City and State Forms Brings Objection to Ordinance

CHICAGO, Nov. 27—The Chicago Garage Owners' Assn. will endeavor, at the next session of the state legislature, to effect changes in the state law requiring garage owners or proprietors to keep detailed records of the cars in their garages. At present the keeping of two sets of records is required, one under the state law and an entirely different form of record under the city ordinance. The state law requires a card to be filled out and signed by the owner or driver of the car. Literal compliance with both the state law and the city ordinance is considered almost impossible and recently several garage proprietors in Chicago were fined $25 and costs each for failure to keep proper records.

The Garage Owners' Assn. will work for the enactment of a simplified law which will be uniform throughout the state and provide for keeping of necessary records without imposing too great a burden on the proprietor. The association expects to cooperate with the Illinois Automotive Trade Assn. in the effort to bring about the enactment of such a law.

A membership campaign is under way by the Garage Owners' Assn., a feature of which was an entertainment at a local hotel Nov. 15 at which non-members were guests. The "Shop Profits" film of the A. E. A. was shown, after which there was a dinner and vaudeville entertainment. About 230 were present.

Motor Truck Industries, Inc., Is New Name of Old Association

DETROIT, Nov. 25—Title of the National Association of Motor Truck Industries was shortened at a meeting this week to Motor Truck Industries, Inc., and co-incident with the change, the board of directors was increased to 15 members, nine truck manufacturers and six part makers, to permit of more effective handling of the association's business.

M. L. Pulcher, president of Federal Motor Truck Co., will continue as president with H. T. Boulden, vice-president of Selden, as first vice-president; Fred Glover, president and general manager Timken-Detroit Axle, second vice-president; Don F. Whittaker, general manager of the association as secretary and general manager, and A. S. More, president of Denby, as treasurer.

A service committee headed by George Dow, service manager of Federal, will be named which will make an immediate study of the used truck situation.

Sound Credit, Keen Competition in 1923

M. A. M. A. Questionnaire Brings Opinions of Leaders

"Most Encouraging Outlook," Say Heads of Large Manufacturing Companies

NEW YORK, Nov. 27—"What, in your opinion, is the automotive outlook for 1923 with respect to finance and credit?" is the question asked of some of the leaders in the industry by M. L. Heminway, general manager of the Motor and Accessory Manufacturers' Assn., in a questionnaire sent out. Replies received predict sound credit conditions and keen competition.

Heminway's correspondents in this symposium unite in declaring for unremitting vigilance in granting credit and show optimism tempered by caution as well as displaying a forward-looking faith in the dynamic progress of the automotive industry.

Representing the vehicle manufacturers, A. R. Erskine, president of the Studebaker Corp., said: "The outlook for 1923 in respect to credit, finance and sales is most encouraging. I believe the volume next year will equal if not exceed this year."

According to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, a few of the car manufacturers may have some difficulty, but on the whole the credit and financial outlook is good. He points out that arrangements are being made with 22,000 bankers throughout the country to get credit for dealers, particularly in the carrying of floor stocks, while more and more finance companies are entering the field to handle the retail sales.

"In general," says G. Brewer Griffin, manager of the automotive department of the Westinghouse Electric & Manufacturing Co., and a director of the association, "we are watchfully optimistic regarding the automotive vehicle business for 1923, as the general business of the entire country promises to be better than during 1922. Most cars sold this year have been sold in cities and large towns. It is thought that the small towns and farmers will begin to buy shortly after the first of the new year.

"Many vehicle manufacturers seem to believe that unless they and their distributors accumulate a stock of cars this fall and winter, there will be a shortage against spring demand. If this view has a foundation in fact, then we believe that there will be no difficulty in financing the business.

"But dealers must be careful not to over-extend their credit capacities by sales on too low initial payments and too long time payments, if the support of the local banks is needed or expected. There is a danger to the dealer in selling cars to 'good moral risks' who have no fixed income, unattached real estate, or nothing beyond a small salary or wages. All paper taken by dealers should have at least one good endorsement."

1923 to be Financial Test

According to many representative parts manufacturers, 1923 will be the final test of financial strength for small automobile manufacturers.

"It is our opinion," says a leading carbureter manufacturer, "that the finances of the better companies will improve during the first six to nine months of the year 1923, and on the other hand, we will not be surprised if some of the companies which are not well financed will find it necessary to drop out. Whether they will discontinue doing business or will be absorbed by some of the larger companies we cannot say, but we assume that there are so many cars on the market today that the manufacture of some of them could be discontinued without having a bad effect on the industry.

Similar views are expressed by many other unit manufacturers and suppliers of raw material who are in close touch with the basic conditions in the industry, but they all agree that this does not represent a pessimistic outlook for the trade as a whole. Furthermore, it is pointed out that many small concerns with a sound product and a strong clientele are not necessarily weak because they happen to be small. Some small concerns are in better shape financially than several of their larger competitors. In the main, though, the outstanding vehicle manufacturers in the principal price divisions are making sharp inroads on the business of the smaller manufacturers through economies in production and distribution.

One of the largest parts manufacturing concerns in the country has this to say:

"Finance and credit will be on easier footing than in 1922, due to the remarkable performance of the industry. It will carry into the year 1923 the conviction to bankers and financiers that the automobile industry is on a sounder and more popular basis than ever before."

Car makers who do not give excellent value for the money will have a difficult time, say many executives. In general, 1923 will be a year calling for vigilant work on the part of credit managers. A representative Detroit parts manufacturer sums up the situation thus:

"There is a feeling among financial men that the next few years are going to bring very strong competition among automobile companies and therefore the financial men will have to be very careful in giving credit, for while some will make large profits, many will fall by the wayside. This condition will not change until business has really cleared itself of practically all weak concerns and is in the hands of a few strong companies."

"Most of the weak sisters have already been eliminated," says a Cleveland accessory manufacturer, "and the few remaining ones will be either refinanced on a sound basis or eliminated from the field by the force of competition, thus leaving the industry as a whole in better shape, or, another manufacturer expresses it, 'those car manufacturers now in good financial condition will show a steady improvement and those not at the top will probably fall back.'"

Lincoln, Ill., Dealers Hold "Automobile Day" Festival

LINCOLN, Ill., Nov. 25—Automotive dealers of Lincoln cooperated with the other business men in making Automobile Day on Nov. 2, one of the most successful events of a fall festival, arranged as a trade stimulant. Valuable prizes were given away by the dealers and merchants generally, the awards being divided as follows:

Largest load of people coming the longest distance in a car; for the muddiest car; for the oldest couple driving a car; for the newest car; for the shortest man driving a car; for the youngest married couple coming in a car; for the fattest man in a car; for the oldest man driving a car; for the youngest baby coming in a car; for the car coming the greatest distance; for the car bringing in the greatest number of people; for the smallest woman in a car; for the fattest woman in a car; for the most baldheaded man in a car; and for the most dilapidated car.

GETS SEAT PAD PATENT

ST. LOUIS, Nov. 25—The Wedler-Shuford Co. announces that on Nov. 21 it was granted letters patent No. 1,436,459, covering the basic construction of "Ever Klean" seat pads. The company further announces its intention to prosecute any infringement of this patent.

Insurance Companies Study Grading of Accident Rates

PHILADELPHIA, Nov. 25—Representatives of companies writing automobile insurance have appointed a special committee to investigate the possibility of grading automobile rates based upon the accident record of individual drivers. This committee has under advisement a scheme whereby a motor vehicle operator after a year without accidents could reinsure at lower rates because of his good showing.

These underwriters declare that if compulsory insurance prevailed a reduction of 50 per cent in the rate would be possible.

General Motors Describes Complete Line of Automobiles

Forty-nine Cars Make List of Firm's Output; Seven Trucks Also Manufactured

DETROIT, Nov. 25—In a pamphlet just off the press, General Motors lists and describes its complete line of passenger automobiles. Some of the figures suggested by a tabulation of the information printed are of real interest.

The five divisions of the corporation that manufacture passenger cars are producing 26 individual types of cars, ranging in size from the two-passenger roadster to the seven-passenger imperial limousine. Of all types, the five-passenger sedan is numerically the most popular; the divisions make seven different styles of this car. Next in popularity comes in the two-passenger roadster, of which six styles are made. The familiar five-passenger touring car comes in five styles, one from each division. These figures are suggestive of the trend of manufacture, as showing the increasing popularity of the enclosed models.

If the passenger cars made by General Motors were on exhibition in one hall, with an example of each individual style manufactured, there would be 49 cars shown, divided as follows: Buick, 14; Cadillac, 10; Chevrolet, 5; Oakland, 6; Oldsmobile, 14. The corporation makes 18 cars of 8-cylinder engine; 15 of 6-cylinder engine; and 16 of 4-cylinder engine.

Besides its passenger cars, General Motors makes seven trucks, ranging from one ton to five tons, and three tractors, 5-ton, 10-ton and 15-ton.

In the wide range of price classes, the following figures are noted: $500 to $1,000, 11 cars; $1,000 to $1,500, 13 cars; $1,500 to $2,000, 13 cars; $2,000 to $2,500, 2 cars; $2,500 to $3,000, 0 cars; $3,000 to $3,500, 3 cars; $3,500 to $4,000, 3 cars; $4,000 to $4,500, 3 cars; above $4,500, one car, at $4,600.

Besides the details on vehicles, the pamphlet states briefly the scope of General Motors and its 67 divisions, subsidiaries and affiliated companies, and its activities on this continent and overseas.

Cars in Massachusetts Must Have Approved Rear Lights

BOSTON, Mass., No. 25—The Motor Vehicle registrar of Massachusetts has begun testing automobile rear lights to see which ones comply with the new State law, which becomes effective Jan. 1. Under the new law every automobile and truck operated in the state must be equipped with a rear light which clearly illuminates the license numbers so they can be read at a distance of 50 feet. It is further necessary for the lights used to bear the official approval of the registrar.

Up to this time, 61 makes of lights have been submitted to the department and only 18 have been approved. The registrar said in a recent statement that he expected many more to be approved before Dec. 1.

It is estimated that 400,000 replacement lights will be necessary to make all motor vehicles now owned in the state comply with the law.

Makes New Long Distance Record

NEW YORK, Nov. 24—A new transcontinental motorcycle record of six days, 15 hours, 13 minutes, actual running time has been established by Wells Bennett of Portland, Ore., who arrived Nov. 1 from Los Angeles. The distance was 3,296 miles. Bennett rode a De Luxe model Henderson, four cylinder, and lowered Cannonball Baker's record by 7 hours, 39 minutes.

BANKER TALKS ON USED CARS

PHILADELPHIA, Nov. 25—Members of the Philadelphia Automobile Trade Association held a get-together meeting at the organization's headquarters and listened to talks on trade conditions by prominent business representatives of the city.

Louis C. Block, president, presided and introduced Edward Randolph, vice-president of the Girard National Bank. Randolph predicted good general business in 1923, basing his view on the fact that construction is going ahead rapidly, labor is more or less satisfied, cotton and wool growers have reason to be pleased and the railroads are at last carrying merchandise to capacity. He indorsed the Trade Association's used car plan and stated that bankers regard with favor such conservative business methods. He said that he felt, however, that the saturation point for consumption of automobiles was in sight and that dealers must insist on factories changing their policy of forcing them to take in cars when there is not a ready market. He warned them against over-allowances on traded-in cars, involving possible sacrifice when the used cars are eventually sold.

FLINT DUE IN DECEMBER

NEW YORK, Nov. 25.—Durant Motors expects to have the first of the new Flint cars out by the first week in December. There has been a slight delay in the original program, caused by a few changes in engine proportions. The Flint engine will be made by Continental but will be built along lines laid down by both Durant and Continental engineers.

AUTOMATIC SIGNALS IN ST. LOUIS

ST. LOUIS, Nov. 24—The first automatic traffic signal to be used in St. Louis was put in operation at Newstead and Lindell Blvd. The signal, which consists of a standard surmounted by a red light, with the words Stop and Go, is similar to the style and type used in Chicago and other cities. Several others at various points are being erected.

Program for Good Roads Congress Is Announced

Thirteenth Session of National Body to Be Held in Chicago Jan. 16

CHICAGO, Nov. 25—The program has been announced for the Thirteenth American Good Roads Congress, to be held at the Congress Hotel here, Jan. 16, 17, 18 and 19 under the auspices of the American Road Builders' Association. The opening session will be marked by an address on "The Future," by Thomas H. MacDonald, chief of the United States Bureau of Public Roads.

The afternoon of the first day will be devoted to the subject of road design, with MacDonald in the chair. Among the speakers will be Clifford Older, state highway engineer of Illinois; Lloyd Aldrich, consulting engineer, San Francisco, Cal.; A. T. Goldbeck, engineer of tests, U. S. Bureau of Public Roads; H. F. Clemmer, testing engineer, Division of Highways, Springfield, Ill.; Vernon M. Pierce, district engineer, U. S. Bureau of Public Roads, and C. M. Upham, state highway engineer, Raleigh, N. C.

Wednesday will be devoted to subjects having to do with construction, with J. H. Cranford, president of the Cranford Paving Co., Washington, D. C., in the chair.

The subject for Thursday morning will be "Maintenance," and the chairman will be A. R. Hirst, state highway engineer of Wisconsin. A number of speakers will discuss the maintenance problems of various types of roads.

The subject for Thursday afternoon will be "Traffic," with Thomas J. Wasser, state highway engineer of New Jersey as chairman. One of the speakers at this session, on the subject of "Changes Needed in Motor Vehicles Legislation and License Fees," will be Harry Meixell, Jr., of the National Automobile Chamber of Commerce.

Finance and miscellaneous subjects will be discussed at the closing session Friday morning.

Geneva Factory to Build New Lancia "Frameless" Car

PARIS, Nov. 10—(By mail)—The Piccard-Pictet automobile factory at Geneva, idle since that firm went into bankruptcy, has just been sold by auction to a newly formed company which intends to use it for the construction of the new Lancia "frameless" car. The factory changed hands at six million Swiss francs. The new Lancia, which was shown to the public for the first time at the Paris Salon, has frame members and body in one unit, with a 122 inch V-type aluminum four cylinder engine.

Hupp Proposes to Build 40,000 Cars Next Year

Distributors in Convention at Detroit Contract for More Than Scheduled

DETROIT, Nov. 25—Hupp Motor Car Corp. has set a schedule of 40,000 cars for 1923, approximately one-third of which will be enclosed cars. The schedule represents one-third increase over the schedule for this year which was fixed originally at 30,000 but which will reach approximately 35,000. It has been estimated that export business in 1923 will reach 2,500 cars, an increase of about 1,000 over the total this year.

The company has just concluded its annual distributor convention which was attended by 90 per cent of its wholesale organization. Contracts for cars for 1923 signed at the convention were in excess of the company's scheduled ouput. It was pointed out, however, that the schedule did not represent the company's manufacturing capacity, but was a conservative figure fixed after careful study of probable business conditions in the new year.

O. C. Hutchinson, speaking at the convention, said the company's dealer and sub-dealer organization had been increased from 900 to 1500 during the year, and that further increases would be made this year. The company will hold its usual dealer meetings at New York and Chicago during the national shows at each of which 500 dealers will be entertained.

Hutchinson Urges Cooperation

Hutchinson urged the distributors to cooperate and assist dealers in meeting merchandising requirements. Particular attention should be paid to educating the retail salesmen, as these men, he said, in the final analysis are the ones who eventually sell all the cars for the factory. Marketing methods should be studied and improved constantly, he said, so that dealers may keep their establishments at high efficiency.

The only reports the company has had of used car difficulties were from dealers who tried to do more business than their districts warranted, Hutchinson said. At the time the factory pointed out the fallacy of forcing business, he declared. Under its merchandising policy Hupp was always in position to divert its product to districts in which there was assured demand, he said, without loading dealers in territories temporarily caught up.

C. E. Salisbury, service manager, described the company's flat rate system, which he said was now being used by practically all of its distributors. Within a short time all distributors and larger dealers will have the flat rate system in effect, he said, as experience has shown it to be most satisfactory both to the owner and to the operator of the large service shop.

President Charles D. Hastings welcomed the distributors, and other speeches at the convention were by F. B. Sides, assistant sales manager, who spoke on the detail of handling and filling of orders; Stan E. Comstock, sales manager of Williams & Hastings, Detroit distributors, on retail selling and used car sales; Dubois Young on production problems, and T. F. McManus, advertising counsel, on the ethics of advertising, showing how the company had benefited by the consistency of its announcements.

New Car Makes Their Honeymoon Complete

NEW YORK, Nov. 25—When Frank Frisch, third baseman of the world's champion New York Giants, took Miss Ada Lucy to be his bride the other day, he also took unto himself this new enclosed car so that their honeymoon might be complete.

FIRESTONE'S BEST YEAR

AKRON, O., Nov. 25—The Firestone Tire & Rubber Co., on Oct. 31 closed the most successful year's business in its history. The official figures of the company, now being prepared, will show profits in excess of $8,000,000, it is stated. The company started the year well. During 1921 it wrote off more than $16,000,000 in inventory losses, and commitments, and started the past fiscal year on a rock bottom basis. Tire sales were unusually heavy for the company during the past year, reaching a peak of 28,000 casings a day.

DEALER CONDUCTS SCHOOL

CHICAGO, Nov. 25—A school for owners and drivers of Ford cars and trucks is being conducted by Charles J. Dempsey, Inc., Ford dealer at 2300 West Madison St., Chicago. Classes are held from 7:30 to 9 o'clock every Tuesday evening for 10 weeks. Lectures are illustrated with charts and at the end of each lecture a printed copy, containing reproductions of all the charts used, is given to each pupil. A tuition fee of $5 is charged to cover the cost.

Proposed Changes in Classes of Oil Considered by Committee

WASHINGTON, Nov. 25 — Proposed changes in the classification of lubricating oil specifications have been taken up by the Interdepartmental Petroleum Specifications Committee, in a joint meeting just held in Washington between that organization and the Lubricants Division of the Society of Automotive Engineers and the Technical Advisory Committee of the American Petroleum Institute.

The conference recommended that four names should be used together with descriptive numbers in the designation of descriptive names for lubricating oils in the Federal specifications. They are: Light oil, to cover Society of Automotive Engineers Nos. 15 and 20; medium oil to cover numbers 30 and 40; heavy oil to cover number 50; extra heavy oil to cover 60, 80, 95 and 115. The conference also recommended the measurement of viscosities of oils up to 500 series at 100 deg. F.; 600 series and higher at 210 deg. F.

It was further decided to request the Interdepartmental Committee to omit requirements for organic acidity from all motor oil specifications; also to make investigations into the relation between acidity, emulsion tests and service; also into the relation between oxidation and evaporation and service tests. The subjects of color, carbon residue and pure tests requirements for lubricating oil were discussed but no action taken.

The Interdepartmental committee has taken all of these proposals under consideration and will take decisive action at a meeting to be held later.

Passenger Pays What He Thinks the Ride Is Worth

FOXBORO, Mass., Nov. 24—A bus service was recently started here to be operated the principle that no fixed fare would be charged but the rider would be asked to pay whatever he wished. It was at once nick-named the "conscience fare" bus. It is looked upon as an interesting experiment.

Offers Prize for Solution of Boston Traffic Problem

BOSTON, Nov. 25—Motor dealers of Boston are very much interested in the offer made by Mayor James M. Curley to Massachusetts Institute of Technology in an effort to solve the problems of congested traffic in Boston. The dealers realize that less congestion would aid sales and lessen accidents, not to mention the great amount of time wasted now on demonstrations and calls trying to get down through the crooked, narrow streets in the Hub.

Mayor Curley announces a prize of $500 to the Tech student who furnishes him with the best practical working plan or plans for unsnarling Boston's acute vehicle traffic congestion; for improved methods of keeping public highways clean; and for correcting and minimizing the unsanitary condition arising from certain types of industrial and commercial establishments within the city limits.

PLACARD PROTECTS DEALERS

PEORIA, Ill., Nov. 25—The Peoria Automobile Dealers and Accessories Assn. has introduced a new help to its members in a card which prominently tells all comers that the garage or salesroom in which it is displayed, is protected by the association. In a letter which accompanies the card, an account is given of how generous the automobile dealer is in contributing to "every Tom, Dick and Harry" who comes along with his hand out.

This, the association says, must stop. The dealer, rather than to argue with solicitors will pay them what they ask, to get rid of them. With the new membership card, however, it plainly states, that "Our by-laws require us to refer solicitors of all kinds to the secretary" who, according to the letter, will consider the propositions with "painful and lamentable indifference."

GMC INCREASES PERSONNEL

NEW YORK, Nov. 25—Additions were made to the executive committee of the General Motors Corp., at its last directors' meeting. Charles S. Mott, executive vice-president of the GMC in Detroit, and Fred J. Fisher, president of the Fisher, president of the Fisher Body Corp., were the ones chosen. At the same meeting James D. Mooney, president of the General Motors Export Co., and John L. Pratt, general manager of the accessory division of the General Motors Corp., were elected vice-presidents of the corporation.

STUDEBAKER EXCEEDS 100,000

SOUTH BEND, Ind., Nov. 25—At the end of the day Nov. 15 the Studebaker factory had produced this year 100,008 6-cyl. automobiles, thus surpassing the production schedule of 100,000 for 1922 which was set at the beginning of the year.

All the company's plants continue to operate at capacity and factory additions are being constructed in South Bend and Detroit. A production of 150,000 cars in 1923 is planned.

MAKING 200 STARS A DAY

NEW YORK, Nov. 25—The first of the Star cars to be manufactured at the Elizabeth plant came through on schedule last week. While production will be at the rate of 25 a day for the time being, it is expected that by June 1 the Elizabeth plant will be turning out 500 Stars and 150 Durant fours a day. Elizabeth is the fifth Durant plant to start Star production and the output is in excess of 200 a day in all these factories.

Enclosed Car Sales Reach Half of Total in Louisville

Amount to 38 Per Cent in Low Price Field and 60 Per Cent in High Price Field

LOUISVILLE, Ky., Nov. 27—Nearly half of the automobiles sold in Jefferson county during the present year have been enclosed cars, according to figures compiled by the Louisville Automobile Dealers' Association. This represents a substantial increase over 1921, when the proportion of enclosed cars was about one-fourth of the total sold.

An analysis of the figures shows that a considerable difference exists between low and high priced automobiles in the matter of percentage of enclosed cars. In the low priced field the enclosed cars sold in 1921 were 20 per cent of the total sales. In 1922 this percentage has increased to 38 per cent.

In the high priced field there is a higher percentage of enclosed cars. Last year it was 41 per cent. This year it is 60 per cent. Thus it is clear that the tendency is toward enclosed cars, no matter whether in the low, medium or high priced field.

CHICAGO BUS PERMIT GRANTED

CHICAGO, Nov. 22—Permission to operate motor busses over 35 miles of Chicago south side boulevards has been granted by the Illinois Commerce Commission to the reorganized Chicago Motorbus Co., of which the president is John A. Ritchie, formerly head of the Fifth Avenue Coach Co., of New York. The application of the Depot Motorbus Co. for a similar permit was denied.

The new service must be inaugurated within six months, according to the terms of the permit. Officials of the company state, however, that service will be started in a shorter time and that from 40 to 50 busses will be put in service at first. The buses are to be manufactured in Chicago by a new corporation headed by Ritchie and operated in connection with the Yellow Cab Manufacturing Co.

LARGE PACKARD DIVIDEND

DETROIT, Nov. 25—Packard Motor Car Co. will pay a 100 per cent stock dividend on Dec. 16 to holders of common stock. Directors at a meeting this week determined such action in order that a portion of the accumulated surplus should be permanently invested in the business to care for needs created by its rapid expansion.

BUSSES PROPOSED FOR ST. LOUIS

ST. LOUIS, Nov. 25—Manager Perkins of the United Railways is considering the advisability of operating motor bus lines as an extension of some of the car lines to accommodate residents of outlying districts now without street car service of any kind. The plan is only tentative and would be experi-

Automobile Sales Show Big Increase in North Carolina

Plenty of Employment and High Price of Cotton Make State Prosperous, Says Colin Campbell

DETROIT, Nov. 25—Commenting on business conditions in the South Atlantic district, Colin Campbell, general sales manager of Chevrolet Motor Co., declared North Carolina to be showing remarkable gains in an industrial sense, so much so that hydro-electric companies in that district have announced that they are unable to make additional contracts for power.

Bankers in that district advised him on a recent trip that bank deposits in that state have reached a higher mark than ever before. Many cotton factories are working two shifts, he said, and the demand for help is taxing the district. Under the influence of higher prices for cotton, the last of the crop of two years ago is being rushed to market and there is little possibility of further storing by growers.

The highway construction program of the state is also furnishing a large amount of employment and in addition is creating an increased demand for automobiles. Sales of low priced cars in that territory have shown remarkable increases in recent months, he said, and the outlook for large business in 1923 is especially bright. Better prices for grain and oats in the middle Atlantic states is also strengthening the car demand in those districts, he declared, and a very light volume of buying is looked for following the winter months.

MAKES REPLACEMENT ENGINES

DETROIT, Nov. 27—Selling engines direct to fleet owners and individual truckmen on a replacement basis is the new merchandising idea just adopted by Hinkley Motors, Inc., of Ecorse, Mich., maker of Hinkley heavy-duty automotive engines. Figuring that any good heavy-duty truck should wear out at least three engines, the Hinkley company plans to furnish new engines to the truck owner direct to replace the wornout power plant. This does not apply wholly to trucks originally powered by Hinkley either, for by a new system of motor support a Hinkley installation can be made in any truck of the front-radiator type regardless of the depth of the frame.

AN INTERESTING EXPERIMENT

WASHINGTON, Nov. 28—Experiments recently conducted by the bureau of standards have attained two results of interest to automobilists and campers. The bureau was asked by the air service a short time ago to devise a means of keeping the interior of balloon hangars at as low a temperature as possible, and succeeded. The same methods the bureau announced, can be used for keeping heat out of tourist tents in the summer.

If the outside of a tent is covered with a highly reflecting surface, such as white paint, while the inside is covered with aluminum paint, the radiation into the interior of the tent will be reduced approximately 80 per cent. The scheme of painting tents would also have the reverse advantage at night and would minimize the cold by tending to prevent the intrusion of the colder air into the tent.

Daily Parade Shows Truck Uses

ATLANTA, Ga., Nov. 25—To illustrate to Atlanta business men how their transportation problems can be simplified through the use of light trucks, the Atlanta Ford Motor Dealers' Association held a series of commercial truck parades through all sections of the city each day during the week of Nov. 20, in co-operation with several manufacturers of motor truck bodies for light transportation use. The parades began each morning at 8:30 at the Ford company's plant, and continued through the morning, a different part of the city being selected each day. Twenty separate truck units were shown in each parade, all equipped with a different type of body. Large co-operative advertising space was used in the newspapers by the various dealers during the week.

NO LICENSE FOR TRACTORS

MILWAUKEE, Wis., Nov. 28—The question whether or not tractors are amenable to the state motor vehicle laws of Wisconsin has been settled by an opinion of the attorney general holding that no license need be taken out by the owner. The opinion says that tractors are not "motor vehicles" within the meaning of the statute, and explains: "It should be noted that the state department always has construed the law to exclude tractors from the class of motor-driven contrivances for the operation of which a license is required."

WILLYS-OVERLAND SALES MANAGER

TOLEDO, Nov. 29—L. G. Peed has been appointed sales manager of the Willys-Overland Co., succeeding A. C. Barber, who goes to Chicago to become president of the Overland Motor Co., the Overland branch in that city, a position formerly held by W. H. Taylor, who, it is understood, contemplates moving to California. Peed has been assistant sales manager for Overland for about a year, coming to the position from Toledo, where he was branch manager. Previous to that he was retail sales manager of the New York branch.

R & V KNIGHT INCREASES FORCE

EAST MOLINE, Ill., Nov. 25—The R & V Knight Motor Co., manufacturer of the R & V Knight four and six cylinder cars, is gradually increasing its force in preparation for greater production.

Two Unused Gasoline Tanks Explode, Kill Five Boys

Empty Containers Were Being Moved In Massachusetts When Accidents Occurred

BOSTON, Nov. 27—For the second time within a few weeks a "dead" gasoline tank has exploded here with loss of life. Workmen in Everett removing a tank with a capacity of 150 gallons were placing it on a truck. The tank had not been used since 1916, and had been buried in the ground for several years previously. A pipe through which gasoline had been poured leading to a pump was open. Suddenly flames appeared on the ground. The workmen tried to extinguish them. The flames communicated to the tank, an explosion followed and the two ends were blown out. One end struck a little boy and so injured him that he was rushed to the hospital and the doctors said he would die.

A few weeks ago exactly the same thing happened in Somerville, a couple of miles away, except that the tank was waiting to be taken off when it blew up and four boys were killed. As a result of these two accidents State Fire Marshal Neal has issued the following order:

"No tank which has contained volatile or inflammable liquid shall be taken from the ground or moved without a special permit from the chief of the fire department in the district in which the said tank is located."

It is believed that some refuse remained in the tank, and it spilled on the ground, and one of the workmen carelessly threw a match down. In the other accident it was thought that the boys were smoking and one of them either threw a match or a lighted cigarette in the tank causing the explosion.

PREMIER SALE POSTPONED

INDIANAPOLIS, Nov. 29—Judicial sale of the Premier Motor Corporation assets scheduled for Nov. 14 was postponed by court order until some future time. No announcement has yet been made of the date, or whether the proposed judicial sale will be made. At the time when the sale was originally ordered by the court it was said that in the event of the judicial sale being unsuccessful there would be public sale at auction.

CONFERENCE ON STEEL NAMES

WASHINGTON, Nov. 25—A conference to consider the desirability of providing a system of designating qualities or kinds of steels by code numbers, has been called by the American Engineering Standards Committee at the request of the United States Bureau of Standards. The conference will be held in the Department of Commerce Building, Dec. 6.

CONCERNING MEN YOU KNOW

Harry Lane Morris, formerly of the Morris Motor Sales Co. of Chicago, and more recently district sales manager for the Mitchell Motor Co., has been appointed Haynes district sales manager, according to an announcement made by Gilbert U. Radoye, director of sales and advertising of The Haynes Automobile Co.

C. B. Peschman has just resigned the Cleveland branch managership of The Goodyear Tire & Rubber Co. to accept the position of manager, eastern sales division of the Denman-Myers Cord Tire Co. He will make his headquarters at Boston, Mass.

J. S. Draper has been appointed assistant sales manager of Hudson Motor Car Co., his appointment being part of the change in the sales department by which Harry G. Moock becomes sales manager and H. B. Phipps, export manager. Draper was formerly identified with the company as district manager.

Harry S. Whitehair has joined the national sales division of the General Motors Truck Co. Whitehair will have general charge of all territory outside of New York and Chicago where the company already has headquarters in the national division. His joining the GMC organization is the result of the executives' belief that large units of industry are back in the truck market again.

Alphone G. Heringhaus of LaFayette Motors Corp. has resigned to become associated with the Fisher Body Corp. Heringhaus will travel from the Detroit office of that concern.

Myron H. Clark has been elected president of the Tyer Rubber Co., Andover, Mass., maker of Tyrian tires. Clark formerly was manager of footwear and miscellaneous factories of the United States Rubber Co. Walter E. Piper, formerly manager of the Boston Rubber Co., has been elected vice-president of the Tyer company.

M. Herbert Beary has been appointed special factory representative of the new Bethlehem Motors Corp. He will make his headquarters in Kansas City, Mo.

Clyde E. Erskine, for many years connected with the Chicago branch of the Mack International Motor Co., has been appointed manager of the St. Louis branch of the factory at 2800 Pine St.

R. C. Frampton, president of the Hudson Frampton Motor Car Co., St. Louis, Hudson and Essex distributors, has been elected to the directorate of the St. Louis Automobile Dealers' Association. Frampton, who last year was president of the association, succeeds F. H. Squires, formerly branch manager in St. Louis for the White Co.

O. L. Smith, chief inspector and efficiency engineer for the Velie Motors Corp., Moline, Ill., has resigned after 13 years service with the Velie Motors. He will join the Lowden Machine Co. forces in Fairfield, Ia.

William H. Graves, assistant chief metallurgist at Packard Motor Car Co., has been appointed chief metallurgist to succeed C. E. Barnes who has resigned. R. R. Robinson has been appointed assistant manager of purchasing.

Ray Harroun, former international race champion, has joined the organization of The Marvel Co. in Flint, with combined responsibilities in executive engineering and sales. The Marvel Company, which has heretofore served as a source of carbureter supply only a limited number of large manufacturers, is inaugurating a plan of expansion which the increased facilities of its new plant make possible.

Louis E. Clarke and James B. Watson are appointed by the Hoyt Metal Co. of St. Louis, to complete the introduction of radiated bearings to the industry.

Paul B. Vosburg, who had been service manager of U. S. Light & Heat Corp. since September, 1919, died Nov. 6.

H. M. Fletcher of Detroit, identified with the automobile industry for the last ten years, is one of the latest district traveling sales managers to be appointed by Gilbert U. Radoye, director of sales and advertising of The Haynes Automobile Co.

C. L. Philbrick of Winston-Salem, N. C., has taken charge of the Franklin agency at Raleigh, N. C. He is succeeded as manager of the Winston-Salem agency by Carl E. Hine.

Ronald T. Strong, representing the Westinghouse company, has established a sales office at 1101 W. O. W. Bldg., Omaha.

E. J. Filiatrault, president of the Mutual Auto Co. of Duluth, Minn., died Nov. 20 in a Minneapolis hospital after an operation. He has been president of the Minnesota State Automobile Association until ill health caused his resignation.

H. B. Knudson, 51 years old, well known automobile dealer in Duluth, Minn., is dead after a short illness.

P. A. Williams, Jr., head of the Williams Motor Sales Co., Springfield, Mass., is to be host at a gathering of 100 dealers at a dinner in the City Club, Boston, Dec. 16.

William Holt, for 17 years connected with the Manufacturers Supplies Co. of Philadelphia, has organized the Cooper Tire & Battery Co., to distribute Cooper tires and Cooper batteries with headquarters at 1338 Cherry street, Philadelphia, Pa.

David Rosenbach has resigned as director of sales of the Farran-Kinney Co. of Chicago to become manager of sales for Dalton & Balch, of Chicago, manufacturers of D & B silent timing gears. Rosenbach has been in the automotive equipment field for over 20 years, having been secretary of the Automotive Equipment Association and sales manager for the Rayfield carbureter.

Fred Glover, vice-president and general manager of Timken-Detroit Axle Co., has been elected to the presidency following the resignation of A. R. Demory. The resignation is effective Dec. 2, at which time Glover will assume the presidency and H. W. Alden succeed to the position of chairman of the board.

November Sales in New York Nearly Up to October Figure

Open Cars Have Slumped, But Demand Is Good for Enclosed Models

NEW YORK, Nov. 25—There is little evidence of a seasonal slump in passenger car sales in the metropolitan district. Present indications are that sales for November will closely approximate the totals for October. Open car sales have undergone a seasonal slump, but the strong demand for enclosed models has counterbalanced any losses from this reason. In some lines, enclosed car sales are being materially hampered by the inability of dealers to get cars from the factory.

In the low and medium price classes, there has been no noticeable slump. Enclosed cars represent about three quarters of the sales. In the higher price ranges, there has been some falling off in sales but, at that, the volume is satisfactory for this reason of the year.

The monthly sales analysis published by Sherlock & Arnold shows that in the low and medium price ranges, October sales were less than two per cent behind September and in the high price class, sales during October were about 30 per cent ahead of September. Total sales for all price classes in October were greater than in November. As compared with October, 1921, October of this year shows an increase of about 30 per cent.

Comparison of Sales 1921-1922

	Low and Medium Price Class		High Price Class	
Month	1921	1922	1921	1922
Jan.	483	2,014	145	283
Feb.	1,409	2,230	210	273
March	3,396	6,352	487	632
April	4,810	8,428	570	862
May	5,466	8,467	584	961
June	6,522	8,203	495	865
July	5,457	7,816	388	678
Aug.	4,255	5,921	354	516
Sept.	4,004	4,592	331	511
Oct.	3,505	4,518	427	665
Total	39,307	58,541	3,991	6,246

Iowa County Reports Record Year for Automobile Sales

DES MOINES, Ia., Nov. 25—Polk County will buy $8,000,000 worth of new automobiles and trucks during 1922. Sales of motor cars in Polk County alone will total 5,000 in addition to nearly 500 trucks, according to figures of S. P. Whiting, secretary of the motor trades bureau of the chamber of commerce, Des Moines.

"Local dealers sold more cars during the month of October than during September," Whiting declared recently. "During the month of September 358 cars and 24 trucks were sold. In October 464 cars and 35 trucks were sold. The increase of November over October, while not usual, simply shows that the general public is getting sold more and more every day on the fact that the motor cars are necessities and not luxuries."

SOUTHERN JOBBERS MEET

ATLANTA, Ga., Nov. 24—That automotive equipment business among southern wholesalers has now reached the highest point since the inflation period of 1920, and is steadily getting better over the entire district, was the consensus of the several southern jobbers who attended the convention this month of the Southern Automotive Equipment Jobbers' Association, held at Nashville, Tenn. More than 50 of the South's leading jobbers and their salesmen were present, with a number of factory representatives of various equipment lines. E. H. Baughman, of the Ozburn-Abston Co., of Atlanta, is president of the organization.

NEW INDIAN MOTORCYCLE

SPRINGFIELD, Mass., Nov. 25.—The Hendee Mfg. Co. announces a new super powered model, the Indian Big Chief, of 74 cu. in. piston displacement. The Indian Chief was brought out in 1921.

MORELAND ELECTRIC TRUCKS

LOS ANGLES, Nov. 25—The Moreland Motor Truck Co. of Burbank has entered the electric truck field. They will produce assembled units in one, two and three ton sizes. The electric trucks embody General Electric motors and controllers and Hobbs batteries, the later made in Los Angles. Only the one ton model is now on the market, but the other sizes will follow soon.

AMERICAN MOTORS MERGER

PLAINFIELD, N. J., Nov. 27—It is announced that plans for the merger of the American Motors Corp. and the Bessemer Motor Truck Co., of Grove City and Philadelphia, Pa., have been completed and await only the approval of the stockholders to become effective. The new company is to be known as the Bessemer-American Motors Corp.

BUSINESS NOTES

The Hoyt Metal Co., St. Louis, announces the acquisition of manufacturing and sales rights of Radiated Bearings by special arrangement with the Radiated Bearings, Inc., of Chicago.

Setwart-Warner Speedometer Corp. has declared an extra cash dividend of $1 a share and announced its purpose to increase the regular dividend from $4 to $5 a share, beginning next year. An announcement to stockholders states that there is now enough money in the treasury to pay a $5 dividend in 1923 and no indebtedness except current bills.

Black & Decker Mfg. Co., Baltimore, has made some changes in the 1-4 in. electric drill. A Jacobs chuck has been added and the cost reduced from $39 to $28, effective Nov. 10.

The Klaxon Co., Newark, N. J., has announced a reduction in price of the model 5 Klaxon horn from $7 to $5.50. A new model 8 horn has been added to the line, to cost $7.50.

Hopkins Automobile Equipment Co., recently formed in Atlanta, has been incorporated under Georgia laws with $25,000 capital, and W. D. V. Hopkins, president. Several salesmen will be on the road in the southeastern territory for the new company, which will handle all kinds of accessories and equipment.

The Wire Wheel Corp. of America, Philadelphia, of which W. Howard Metcalf, recently elected to the Pennsylvania Legislature, is branch manager, is moving from 328 North Broad street, where it has been for the last seven years, to larger quarters, which will include as a new feature a complete enameling plant, at 222-234 North Fifteenth street.

A reduction of $51 in the price of the new Coupe DeLuxe body for Ford cars was announced recently by the manufacturers, the Coupe DeLuxe Body Co. of St. Louis.

The Autocar Sales and Service Co. of Missouri celebrated the twenty-fifth anniversary of the parent organization, The Autocar Co. of Ardmore, Pa., on Oct. 21, by breaking ground for their new building in St. Louis at the southwest corner of Locust and Leffingwell.

Wm. R. Johnston Mfg. Co., manufacturer of windshield wings, mirrors, curtains and other automobile equipment, has occupied its new factory at 1300-1340 Fletcher street, Chicago, where its production capacity is greatly enlarged.

Thanksgiving Day Race Draws Fast Field at Beverly Hills

LOS ANGELES, Nov. 25—The Thanksgiving day race on the Beverly Hills speedway will witness the first appearance of the new Durant five-man team. The Durant Specials are powered with Miller motors built in Los Angeles. The drivers will be R. C. Durant, Earl Cooper, Jimmy Murphy, Art Klein, and Eddie Hearne.

The return of Cooper to racing will be regarded as a feature. He has driven in only one speedway contest since his retirement from the sport about five years ago. The Durant Specials are proving in practice to be equally as fast as the best cars ever seen here.

Among the other drivers Thanksgiving day will be Milton, Hartz, Elliott, Hill, De Palma, Wonderlich, and probably Wilcox. It is reported De Palma may drive one of the Packard Specials, which will be campaigned next year, as they are now being built in the Miller shops.

GASOLINE TAX ENJOINED

WASHINGTON, Nov. 25—Motorists in the state of Arkansas cannot be forced to pay a gasoline tax, pending the final adjudication of the constitutionality of the question as to whether or not a state can levy a tax of one cent a gallon on gasoline and kerosene.

The Supreme Court has granted an injunction on the application of the Pierce Oil Corp., to continue in force a temporary injunction secured in the Federal courts against the enforcement by the state of a state tax of one cent a gallon on gasoline consumed in motor vehicles.

The constitutionality of the question is now before the Supreme Court and pending the court's decision it was held that the temporary injunction in Arkansas must stand.

200 FORD DEALERS MEET

SALT LAKE CITY, Utah, Nov. 25—The Ford dealers of the mountain country held a two-day convention here last week. About 200 attended from all parts of the territory and the event closed with a banquet. The principal speaker was M. R. Bryant of the Long-Costello Co., Chicago, who talked on sales strategy and illustrated his remarks by charts showing the different classes from which prospects are drawn. Other speakers were Don L. Kimball, of Seattle, Wash., and Hale H. Young, local manager of the Ford Motor Co.

CLAIMS GEARLESS TRANSMISSION

CHICAGO, Nov. 25—Alleging that the Illinois securities law, commonly called the "blue sky" law, is unconstitutional, Charles H. Gill, inventor of a gearless transmission, has filed suit in the United District Court asking that the Secretary of State and Attorney General of Illinois be restrained from interfering with the sale of rights in his patents.

For some weeks Gill has been exhibiting his device in a downtown store room and selling interests in the patent rights for the avowed purpose of raising capital to finance the manufacture of the transmission. It is claimed in advertising literature that the device permits the operation of an automobile without any gear shifting, automatically adapting its gear ratio to the load to be propelled. The experimental model on exhibition is driven by an electric motor under condition bearing no resemblance to those under which an automobile operates.

MAIL TRUCKS FOR FOOD DELIVERY

WASHINGTON, Nov. 25—Congressman M. Clyde Kelly of Pennsylvania has introduced a bill in the House providing for the appropriation of $100,000 to be used in the establishment of motor truck mail routes to facilitate the collection and delivery of food products. The bill has the approval of the Post Office Department and it is the outgrowth of experiments conducted over a period of two years.

12½ PER CENT TIRE INCREASE

TRENTON, N. J., Nov. 27—An increase of 12½ per cent in the price of Bergougnan cord and fabric tires is announced.

Safety Council Plans Drive Against Automobile Accidents

Official States That 80 Per Cent of Mishaps Could Be Prevented by Common Sense

CHICAGO, Nov. 25—Severe indictment of the automobile in the hands of the careless and thoughtless driver as potentially the most dangerous instrument to which man is normally exposed was made by Fred M. Rosseland, chief of the public safety division of the National Safety Council, in a statement here this week in connection with the meeting of the executive committee of the National Safety Council.

The exercise of a little common sense and consideration for others was given as the remedy that would prevent fully 80 per cent of the automobile accidents, and Rosseland spoke very highly of the campaigns being conducted by a number of taxicab and express companies to promote safe driving by their employes. The importance of the automobile dealer as a factor for safety through the proper instruction of new car owners has often been pointed out.

The executive committee of the Safety Council discussed plans for inaugurating an extensive campaign during the coming year looking toward the reduction of the number of automobile accidents. Particular attention is to be paid to conditions in such large cities as New York, Chicago, Detroit, St. Louis, Philadelphia and Boston. Reference was made to the recently published fact that more than 11,000 deaths were caused by automobiles last year and that from present indications the number this year will be fully as large.

"Some accidents may be classed as unpreventable," Rosseland said, "but over 80 per cent of all automobile accidents are preventable through the exercise of a little common sense and consideration for others. It has been said that the automobile potentially is the most deadly weapon to which man is normally exposed. The fact that in 1921 automobile deaths numbered at least 11,000, and that newspaper reports indicate that this year's toll may be as great, if not greater, indicates this without much doubt."

LIST OF SALON ENTRIES

NEW YORK, Nov. 27—Recent entries make a total of 26 makes of cars which will be shown at the Automobile Salon opening in New York at the Hotel Commodore on Dec. 3. The list follows: Benz, Brewster, Cunningham, Daniels, De Bion Bouton, Duesenberg, Fiat, Hispano Suiza, Hotchkiss, Isotta Fraschini, Lanchester, Minerva, Panhard, Rolls-Royce, Rubay, Steyr, Sunbeam, Voisin and Winton, and the following American cars which will be exhibited by custom body builders: Cadillac, Lafayette, Lincoln, Locomobile, Marmon, Packard and Peerless.

IN THE RETAIL FIELD

Gluck-Hennessy Motor Co., authorized Ford and Lincoln dealer, Minneapolis, has moved to 709 Second avenue S., newer and larger quarters.

I. J. Bartlett of the I. J. Bartlett Co., Minneapolis, used car dealer and auctioneer, announces he will distribute the Cleveland car in the Northwest.

F. H. Swival, as Swival & Co., Central avenue and St. Peter street, St. Paul, has taken over local sales for the International truck. Swival had been agent for the Federal truck three years.

The Pence Automobile Co., Minneapolis, wholesaler of Buick cars, has increased its capital stock from $1,000,000 to $3,000,000. Harry E. Pence is president. The company is erecting a building in St. Paul for local headquarters.

The City Motor Supply Co., St. Paul, has broken ground for a three story building at Eighth and Sibley streets, to be ready Jan. 15. This building will be the first garage in the city to utilize ramps. A day and night service will be maintained. G. C. Schoonmaker is president.

Courtroy Motor Co., Price, Utah, has filed articles of incorporation. Capital is listed at $25,000. C. L. Leavitt is president and R. D. Tamplin, secretary.

Glen Gillette and R. L. Stebbins will soon open an automobile repair shop in Millers Falls, Mass.

Alfred Pickup has taken the agency for the Chevrolet in Holyoke, Mass., occupying space in the new building of the Magna Auto Co.

The Elm Garage, Holyoke, Mass., has become distributor of the Paige, Jewett and Haynes.

Formal opening of the Columbus Garage and Welding Co. at the Auto Laundry Bldg., Columbus, Miss., took place in November.

The Mac-Dry Battery Sales Co., a new firm on automobile row, distributors for the Mac-Dry storage battery for motor cars, has completed and opened a sales and service station at 1102 Union avenue, Memphis.

Universal Motor Car Co., Memphis, Tenn., has occupied its new home at 234 Jefferson avenue.

The Joe R. Cook Auto Co., 320 Ripley street, Davenport, Ia., has obtained agency for the Peerless automobile and will also handle the Mack truck.

Nelson Bengston, Urbana, Ill., has purchased a lot on W. Elm street and has broken ground for a modern garage, 60x150 ft. He will embark in business with his son, Raymond, and will operate a sales agency and do a general storage and repair business.

Roy Frey has purchased an interest in the garage at Gridley, Ill., operated of late by Russell Armstrong, and the firm will be known hereafter as Armstrong & Frey.

The Blake Automotive Equipment Corp. has been organized at Quincy, Ill., and will handlle accessories and supplies for motor vehicles at 400 Jersey street.

William Frede & Son, Decatur, Ill., have opened a used car exchange and service station in the new Garver Building, 519 E. William street. W. W. Burns, brother of B. B. Burns, will be manager.

A. C. Hall, for the past five years manager for the Jennings Auto Sales Co. of Springfield, Ill., and **H. F. Herschbach**, formerly with the same company but for two years Ford distributor at Petersburg, Ill., have formed a partnership and will distribute Ford cars upon an extensive scale. Their first venture will be in St. Louis where a modern garage and sales agency will be erected on King's Highway. Work upon the new building will commence on Jan. 1. The two members of the firm will make their home in St. Louis.

The Brock Motor Car Co., 4416 Olive street, St. Louis distributors of various lines of accessories, and retailers of the Haynes and Hupmobile cars, has been appointed distributor for the Mitchell F-50 lines of cars for St. Louis and adjacent territory.

Fred Grinham, formerly of the Chevrolet retail store, and **L. L. Johnson** of the Mephan-Chevrolet Co., have been appointed a Chevrolet retail dealer for St. Louis with headquarters at the southwest corner of Ninth street and Clark avenue.

The Duesenberg Missouri Corp., recently organized in St. Louis to distribute the Duesenberg car in Eastern Missouri and Southern Illinois, has opened a sales and service station at 3912-18 Olive street. Arthur Walsh is manager.

The Schroeder Motor Co., recently organized by Geo. S. Schroeder, well known in the automobile industry in St. Louis through his connection with the Vesper-Buick Auto Co., has been appointed distributor for the Stearns-Knight car in St. Louis. The new company has obtained a portion of the new Melbourn Hotel Garage Building, 3508 Lindell boulevard, for sales and service.

Charles H. Newline, associated with the Hudson Motor Car Co. 11 years, and recently factory branch office manager, has formed a partnership with LeRoy Kussy, and opened a Hudson and Essex salesroom and service station at 114 S. Church street, Rockford, Ill.

Consolidated sales agency and service company of Scott & Martin, Kewanee, Ill., has taken over Jewett line of automobiles, which has been added to the sales department.

The Dugan Motor Co. has been organized and incorporated in Atlanta, having a franchise from the Ford Motor Co. Graham C. Dugan is president of the company. The new company is constructing a display room and service station at 1011 Marietta street, Atlanta.

Charles A. Tway Co. has been organized in Atlanta with $25,000 capital, to establish an automobile distributing branch. Charles W. Tway and G. P. Downing are the incorporators. Tway has been a distributor of the Haynes in Atlanta territory for several years, and is well known in southern automobile circles.

The Keystone Motor Sales Corp., 2909 W. Lawrence avenue, Chicago, has been incorporated with a capital of $25,000 to manufacture and deal in automobiles and motors.

Berning-Payton Motor Co., St. Louis, has been oragnized to succeed the Holmes Motors, Inc., which for several years has distributed the Holmes air-cooled car at 2936 Locust street. The change of name followed the signing of a contract to distribute the Stephens cars. The company will retain the distribution of the Holmes car.

Ward-Groff Motor Corp., formed recently by Roy J. Ward and William C. Groff, both for a long time in the automobile business in St. Louis, has moved into the new building at 2908-09 Washington avenue. The company is one of the Paige and Jewett community dealers for the Newell Motor Car Co. distributors.

The W. E. W. Motor Corp., 918 N. Broad street, Philadelphia, distributor of Durant and Star cars, held a celebration at the Hotel Adelphia, in observance of its first anniversary in business. George W. Wright, president, presided at the banquet, at which there were 175, including the corporation's 37 dealers and members of their organizations, as well as a large number of officials of the Durant Motor Co. of New York, who were the hosts of the occasion.

An involuntary bankruptcy petition has been filed by creditors against Grieb & Thomas, Inc., 306 N. Broad street, Philadelphia, of which M. Clarke Grieb is president and which for years had the local distributorship for Kissel cars and trucks. The Kissel agency has passed into other hands.

W. H. Halpenny of Des Moines, has traded his automobile business for a farm in Northern Iowa. He is going to spend the winter in California and then return to Des Moines and reenter business in the spring. He has distributed Lexington cars in Iowa for several years.

Additions to the building of the O'Dea Motor Co., at 623 E. Grand avenue, Des Moines, Ia., which are under way will double its space. This firm is a Ford dealer.

Charles H. Silverman and Marcus J. Finkelberg have disposed of their interests in the Western Grease Manufacturing Co. and will engage in the used car and accessory business under the name of S. & P. Auto Co. in Des Moines.

Mankato Motor Co., 533-35 S. Front street, Mankato, Minn., was recently appointed Maxwell dealer.

H. W. Stimson, has been appointed Maxwell dealer at Snyder, Texas.

J. G. Condiff & Sons, 432 Main street, Osawatomie, Kan., has been appointed Maxwell dealer, it was announced, by the Missouri Valley Auto Co., Maxwell dealers at Kansas City, Mo.

Maxwell-Chalmers franchises have been granted to J. H. Delperdang of Tripp, S. Dakota.

L. N. Freeman, Lansdale, Pa., has been appointed Maxwell-Chalmers dealer.

Tyndall Tire & Battery Co. is the new Maxwell-Chalmers dealer at Tyndall, S. Dakota.

Frank Williams & Co. have been appointed Maxwell-Chalmers dealers for Stickney, S. Dakota and vicinity.

Fall River Garage was recently appointed Maxwell-Chalmers dealer at Edgemont, S. Dakota.

Announcement is made by the new Bethlehem Motors Corp. of the appointment of distributors and dealers of Bethlehem trucks as follows: Ebert Motor Truck Co., Philadelphia; Merchants Automotive Corp., Newark, N. J.; Bethlehem Motor Dept., Pacific Land Co., Los Angeles, Cal.

Winsome Motor Sales Co., 3515 Armitage avenue, Chicago, has been incorporated with a capital of $7,500 to manage and operate garages, repairing and service station.

Heple Garage, 235 Main street, Salinas, Cal., has been appointed Maxwell dealer.

Anderson Motor Co., 113 Center street, Winona, Minn., has been appointed Maxwell dealer, effective immediately.

The following dealers have recently signed 1923 contracts for the distribution of Dort cars: Baird & Collins, Sturgis, Mich.; F. R. Hiner, Plainwell, Mich.; Ora P. Stewart, Rives Junction, Mich; Tuchtehagen Garage, Albion, Mich.; Howard L. Smith, Adrian, Mich.; Boulevard East Garage, Guttenberg, N. J.; Painter-Jones Motor Co., New Kensington, Pa.; E. K. Eckelberry, Republic, O., and Gehan Motor Sales Co., St. Paul, Minn.

Metzger-Hurlburt Motor Co. has been formed in Detroit by William E. Metzger and William B. Hurlburt to handle sales of Columbia motor cars in Detroit, the company occupying the same headquarters as the Wills Ste. Claire Co. of Michigan, which is also headed by Metzger, and in which Hurlburt has been associated.

A new corporation to be known as the United Automotive Corp., has been formed by Edward W. Clarke, George C. Bronzie and M. J. Rorke, in Greensburg, Pa., to buy and sell motor vehicles.

Announcement has been made of the formation of the Motive Parts Co. of Pennsylvania, with salesrooms at 237 Sheridan Avenue, East Liberty, and its appointment as distributors of parts for Torbenson axles, Buda engines and Russel axles.

The Wahling Chevrolet Co. has been organized at Aurora, Ill., and will open a sales agency and service station at 61 S. River street.

The Watkins Motor Co. is a new concern at Asheville, N. C. The firm, located at 425 Biltmore avenue, will be wholesale and retail distributors for Maxwell and Chalmers cars in 17 counties of Western North Carolina. A full line of parts and accessories will be carried.

The A. H. Vayo Co. has been incorporated at Omaha to conduct an auto sales agency, with a capital stock of $25,000. A. H. Vayo, T. W. Vayo, C. W. Mattson, H. H. Heath and E. A. Wetherald are the incorporators. This new company will have the agency of the Haynes cars for all of Nebraska and Western Iowa.

Cole-Louisville Co. has been appointed distributor for the Cole at Louisville, Ky.

Garth Motor Co. of Birmingham, Ala., has been appointed distributor for the Gray automobile in North Alabama. This concern is also distributor for the Rickenbacker.

Futch-Flowers Garage in Montgomery, Ala., was seriously damaged by fire on the night of Nov. 9. This concern handles Ford cars in the Cloverdale section of Montgomery. The damage was estimated at $15,000.

Dealers Unable to Meet Big California Demand for Cars

LOS ANGELES, Nov. 25—Despite the fact that during October Southern California dealers placed in the hands of buyers 7113 new passenger cars and 841 new commercial cars as against 5599 passenger and 622 commercial cars in the corresponding month of 1921, Ford, Chevrolet, Studebaker and Dodge showed a loss in the number of deliveries over last year. In each instance the reason assigned for this fact is inability to get cars with which to fill orders.

Los Angeles county maintains its leadership as an automobile market for the entire state. Deliveries total 5165 compared to 4066 in October, 1921, an increase of 27 per cent. Kern county made a gain of 62 per cent over last year by having 236 deliveries compared to 145. The total of the next thirteen counties in the state lacked two of equalling the figure in Los Angeles county alone.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Cause for Rejection Can Be Visually Detected

Q—A Chandler is noisy in second gear when driven over 10 m.p.h. There is barely perceptible play in the countershaft bearing, but as this gear runs quietly when letting the engine hold car back on a grade, the trouble must be due to wear in the teeth. How can this be remedied and will it be necessary to replace both countershaft and main shaft gears?

1—It is possible to detect by the eye alone whether the gears will require replacement and we would state that if you wish ideal conditions and a minimum amount of noise that both the countershaft and sliding shaft gears be replaced at the same time. Also would advise that you examine carefully to see whether all the shafts are straight, as a sprung shaft will give a very loud noise at certain speeds. If one gear is badly worn and the other gear shows practically no wear we would suggest that you install only the badly worn gear and you will secure very good results. If both gears show a moderate amount of wear it is advisable to install both of them.

Why Drain Oil?

2—It is recommended that oil in differentials, etc., be drained every 5,000 miles. This because of suspended metal dust or chemical change in oil, and can such oil be reclaimed by heat and settling?

2—Manufacturers of cars and rear axles recommend that the oil be drained at the end of every 5,000 miles for a combination of reasons. In some cases the oil may become rancid, which could be classed as a chemical change in the oil. The second reason is due to the presence of suspended metal dust as referred to in your question. Assuming that the very highest grade oil is used and one that does not decompose or produce detrimental effects after months of usage, it is best to drain the oil in order to prevent the accumulation of any objectionable suspended matter in the oil which would be detrimental to thorough lubrication. 600W, and other brands of heavy steam engine oil do not lend themselves readily to reclaiming, and where any success has been achieved the reclaiming cost is out of proportion to the cost of new oil.

Taking Up Spring Play

3—How is play in the spring shackles taken up? Must the top spring leaf be replaced, or can it be rebushed?

3—Practically all springs are made with removable bronze or steel bushings and the replacement of the spring leaf is not necessary.

Usually when the spring shackles are badly worn it is necessary to replace both the spring shackle bolts and the bushing in the spring eye. As a suggestion, it is advised that when installing spring eye bushings that they be pressed into the spring eye before the final reaming is given, because the pressing will decrease the inside diameter so that it will be too small to allow entrance of the shackle bolt. The final reaming operation should be done after the bushing has been pressed into the spring eye.

Vibrating When Coasting

4—A Ford truck (worm drive) develops excessive vibration when coasting and the speed passes 18 m.p.h. Then when about 23 m.p.h. the vibration ceases. The car has only been driven 1,000 miles and did this from the first. Is there any cure?—W. G. Landon, Heath, Miss.

4—We doubt whether there is any cure for this trouble, as it may be due to a critical or harmonic point in the engine where this vibration exists. We might suggest that you check the pistons and crankshaft for balance, but if the vibration does not occur when the engine is pulling we do not believe there is any cause for worry.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

What Constitutes Fraud in Used Car Sale

On the fifth day of November, 1921, I purchased a second-hand car for $350. Paid $100 cash and balance was to be paid $25 monthly. I was given a contract promising clear title when all money was paid. In that contract are the numbers as follows: Motor number 2941-B, Factory number 353834, model 34B, 19¼ hp.—1918 model.

The payments were made promptly when due until only a balance of $75 remained unpaid. I then learned that the above mentioned numbers were not consistent. These numbers refer to a 1917 car while I was supposed to have bought a 1918. There appears to be no title. I was told by the man selling and, also, his lawyer who was drawing up the papers and who had handled papers for this car in previous sales, that they had the original bill of sale.

The lawyer, also, told me at two different times since that he had the original bill of sale and he never admitted to me that he didn't have the original bill of sale until I had learned definitely that his titles were erroneous. They now refuse to make any adjustment for the difference between the 1917 and 1918 car. They have threatened to proceed against me for balance while I think I am the one wronged. —A Reader.

If you were sold and you purchased a 1918 automobile and without your knowledge and consent a 1917 car was delivered to you, you would, upon discovery of the fraud upon you, be entitled to rescind the whole contract, or you could keep the car and deduct the damages caused you by substituting an older car—this damage would be the actual difference in value of the older car. If the car you received, because of its being an older model than the on contracted for, is worth $75 less than the one contracted for, then you are doing right in withholding this amount, under the contract.

Since the contract gives the correct numbers on the car, you appear to have gotten what your contract calls for. Fraud requires strict proof, but it vitiates the contract. There is a question whether you did not see and know just what you were buying, and the description of the car was not a mere innocent misdescription, or misuse of terms. In other words, that you were delivered just what you contracted for, and there was no fraud. But this is a question of proof.

The law remains that if your purchased a 1918 car and were delivered a 1917 car of less value, you may return the car and demand your money back, or you may retain the car and pay only its real value, upon discovery of the fraud. In case of fraud one must act promptly upon its discovery or the court will hold that one has elected to affirm the contract. Then one may keep the property under the contract and set up the fraud when sued for the balance due.

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

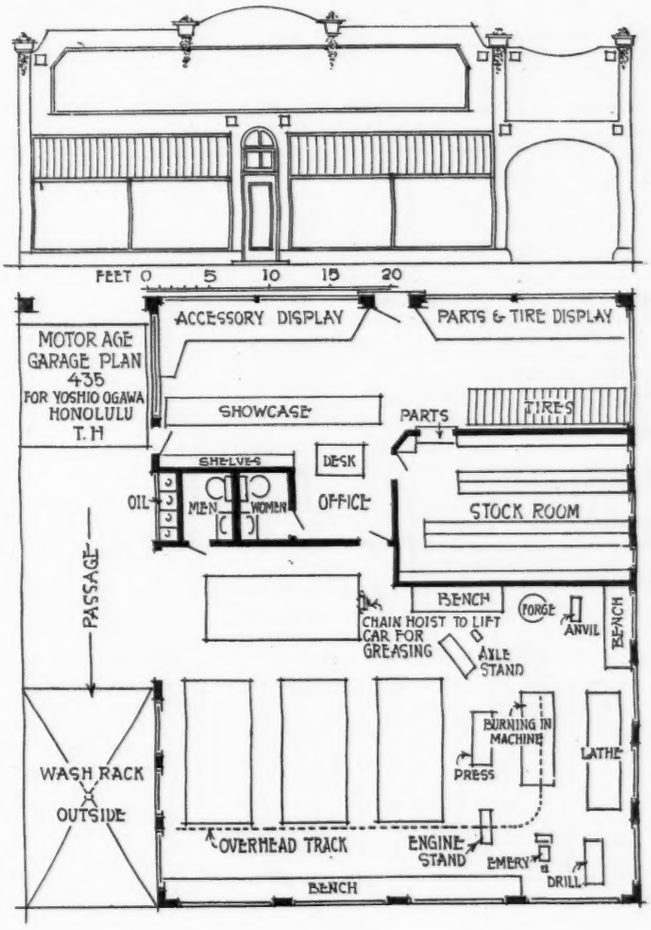
Complete Ford Shop and Accessory Store

Q—Please give me some information on how to arrange a space 40x50 ft., on which I want to build an automotive engineering building. I wish to handle parts for Ford cars and accessories for all cars, and wish to use the front and rear of the building for a modern Ford repair shop equipped with all modern machinery for Ford repairing, also a washrack and greasing bridge for all cars.

The ground for this building is only 40x50 ft. but it is really 51 ft. frontage. I want to take 11 ft. for entrance to the shop and rear of the building because I have several cottages in the rear.

Please advise me how to arrange the space and how to ornament the front of the building most attractively with reasonable expense. I have enclosed a drawing of my own which shows the number of sections I wanted to have. I want to use full frontage 51 ft. for front of the building so building will look larger.

Please send suggestions at your earliest convenience as I want to build according to your plan as soon as I receive same. —Yoshio Ogawa, Honolulu, T. H.



Your plan is well worked out and your details accurate, but you have tried to force altogether too much into a small space. For instance, the space occupied by your greasing bridge is the only aisle through which you can get cars into position in the shop, unless they are pushed sidewise or lifted over one another.

Why not move the washrack into the passage, thus saving a large section of floor space? It would not seriously interfere with your tenants on the rear of the lot. With this space at your disposal you can expand the other departments enough to make them usable.

Grease and oil barrels should not be located in the store with tires and accessories. They are too mussy and dirty. Pumps or faucets in a recess in the passage would be much more convenient and save space as well. Stow away the barrels on a shelf or balcony and pipe the oil down. Greasing may be accomplished by lifting the front end of a car by the body; this leaves the floor space free and also flexes the spring leaves so they can be oiled or greased.

You could build a balcony over the store, office and stockroom and repair tires and batteries here, but you would be wiser to leave those things to specialists and specialize your own shop on machine work. Make an agreement with some battery shop to handle this work for you.

WILL A 12-VOLT GENERATOR CHARGE A 6-VOLT BATTERY?

On page 44 of the Oct. 12 issue of MOTOR AGE there was an article on the operation of a Disco generator, on a Birch car. The generator in question would only charge 4 amperes, and various possibilities were given. Mr. E. G. Glenn, Bemidji, Minn., has written to us, offering the suggestion that possibly the electrician working on the car used a 6-volt battery by mistake instead of using a 12-volt battery. Inasmuch as cars of this make were put out using both 6 and 12-volt batteries, such a thing is a possibility, but removing a 12-volt battery and replacing it with a six would show carelessness at least, on the part of the electrician doing the job.

The underlying electrical law, however, which prompted Mr. Glenn to make this suggestion should be of interest to all. A 12-volt generator in good condition might be capable of charging a 12-volt battery at the rate of 8 or 9 amperes, yet the same generator, when connected to a 6-volt battery, might put out only 4 or 5 amperes. As the opposing voltage is only half, this seems to be a contradictory condition, but the answer is in the fact that being connected to a battery of low voltage, a correspondingly low voltage is maintained across the shunt field. With a very weak magnetic field the generator can only develop a low voltage and this accounts for its inability to charge the 6-volt battery.

This fact is worthy of consideration and accounts for the fact that a third brush machine will charge at a higher rate as the gravity comes up, while a discharged battery will be charged at a lower rate. We accordingly feel that Mr. Glenn's suggestion is of value on account of the electrical principle it illustrates, regardless of whether it happens to apply to the Birch car or not, and we take this opportunity of expressing appreciation for the interest shown in problems of this nature.

DATA ON ORPHAN CAR

Q—What is the bore and stroke of the engine number 1706 used in the Marathon car? The cylinders are cast in pairs, L type, also what model car was this engine used in and what is the hp.—S. A. E.?

1—Because of a lack of data concerning the Marathon car we are unable to tell you the bore and stroke of the engine without knowing the car chassis serial number. There were three four-cylinder engines used in the Marathon car, one had a bore and stroke of 3½x4½, another 4¼x4½ and a third 4½x5¼. The S. A. E. hp. of either one of these engines can be readily determined by use of the S. A. E. formula, which has been printed in this magazine frequently.

2—Where can we secure parts for motor referred to?—Edward Bialas, Two Rivers, Wis.

2—This information will be given by letter. Certain parts are not procurable from stock and must be machined from raw stock.

Testing and Adjusting Generator

Q—We are having considerable trouble with a Gray & Davis generator on a model 6-38 1916 Paige car. In the first place the generator quit charging and we took it off and sent it to Reinhard Bros., Minneapolis, Minn., for repairs. At the time the generator quit charging, the armature seemed to be burnt or at least to have been very hot. On return of this generator we put it on the car and it charged perhaps 10 hours continuously and again quit. We again sent it to Reinhard Brothers and when they returned it they claimed it had been operating on a car with an open circuit between generator and battery.

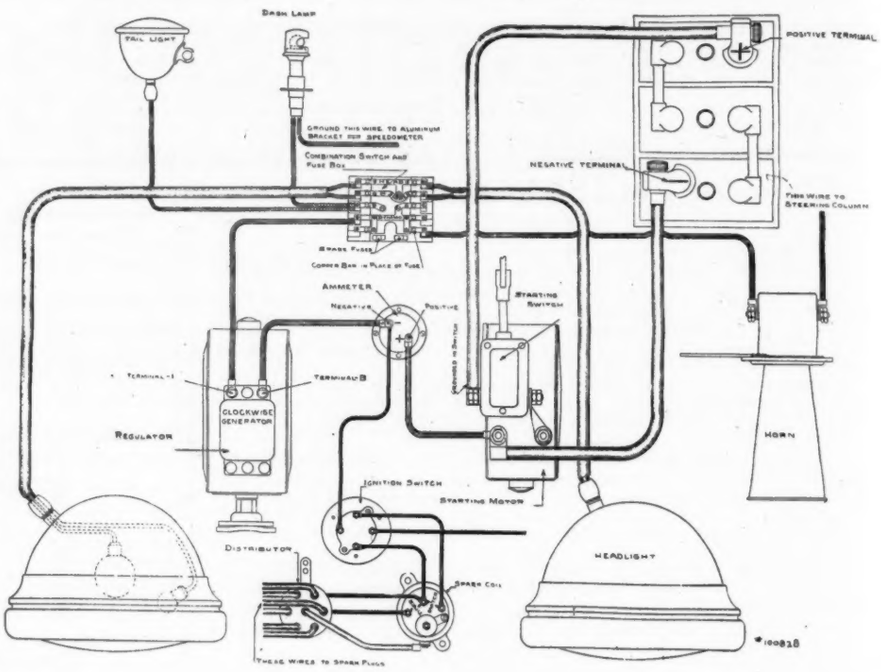
We went all over the car checking the circuits but could find no such open circuit as they described. We put on new wires or connectors on the battery, also new connectors and wires leading from generator to junction box, ammeter and starter switch and tested out to the best of our ability but have been unable to find any reason why this generator should give trouble. However, the generator again quit after the second repair but this time does not seem as if it has been quite as hot as the first time.

We would like to have all possible information as to what might cause this trouble and also as to current that the generator should draw when running as a motor on 6 volts. Would also like wiring diagram of the car.—Hankinson Automobile Co., Hankinson, N. Dak.

There is a very simple test that you could have made to determine whether the generator was operating while disconnected from the battery. This is to take voltage reading at the battery and at the generator terminals while the engine is running at a fair rate of speed. If an open circuit exists, the battery voltage will probably read 6 and the generator voltage 9 or 10 while if an ordinary third brush generator had been used it might go up to 25 or 30 volts if running while disconnected from the battery.

Such a test saves the trouble you experienced in replacing a lot of wires when you did not really know whether they needed replacing or not. Reinhard Brothers are probably correct as far as it is possible to judge from the appearance of the job but besides the possibility of a break in the wiring there is also possible trouble inside the battery itself. The only way to check this is with the generator on the car sending current to the battery, or at least trying to. While operating in this way voltage should be taken across the individual cells of the battery. It may be found that one cell will be 2 volts and another one 10 volts under conditions of this kind, indicating a break between a battery post and the plates to which it is supposed to be connected.

Answering your question as to the motoring current, would say that there should be approximately 3 amperes when the generator is free to turn and is connected to a battery. There is another condition which may account for overheating and that would be improper adjustment of the vibrating contacts in the combination cut-out and regulator mounted on top of the generator. There



are two pairs of these vibrating contacts, each pair controlling one-half of the shunt field. The tension on the spring is controlled by a screw which goes in at an angle and bears on one of the springs.

To properly adjust this machine, paper should be put between one pair of contacts and the other pair adjusted to get approximately 8 amperes. Then the paper should be put in between the other pair of contacts and a second adjustment made, to again get 8 amperes. The paper should then be removed and both pairs of contacts allowed to operate and the charging current should not exceed 10 amperes.

An unbalanced adjustment of the regulator may account for the trouble you have experienced. When properly adjusted, it should be possible to open either pair of contacts and the reduction in charging current should be the same in either case. It should also be possible to hold either pair of contacts closed, so that vibration is impossible, and the same rise in generator current should take place in either case.

In conclusion we would say that your trouble is doubtless in an open circuit either in the battery or in the wiring, the only right way to find it is with a voltmeter, test being made along the circuits until a point is reached where a considerable difference in voltage is found. This point will be the location of the trouble. With battery and wiring in good condition there should not be over ½ volt difference between the battery voltage and the generator voltage.

SPORT CAR ON STEARNS-KNIGHT CHASSIS

Q—We are building up a four-passenger sport car, using a Stearns-Knight chassis, this being one of the four-cylinder 1917 models. What gear ratio is used in this car?

1—4½ to 1.

2—Would a sport body like on a Buick sport model or on a Moon 6-40 fit this chassis?

2—The only way to tell this is to check it up and see, as we have no data as to exact dimensions of all cars and bodies. Inasmuch as you are located where these bodies can be seen, it would be well to find a body that you think will do and then check it up for measurements as to width at the frame, location of seats with regard to steering wheel and similar dimensions which affect the body installation.

3—Would 31x4 cord tire be large enough for the wheels by using Disteel wheels or would 32x4 be better?

3—The regular size wheels of this car are 34x4, so that either 31x4 or 32x4 would be of special size. Smaller wheels would give better pickup but a reduced maximum speed.

4—Advise weight of chassis.

4—This information is not available.

5—Could a Bosch magneto be mounted in place of the Westinghouse generator?

5—Yes, but you will have no place to drive your generator and nothing to keep your battery charged.

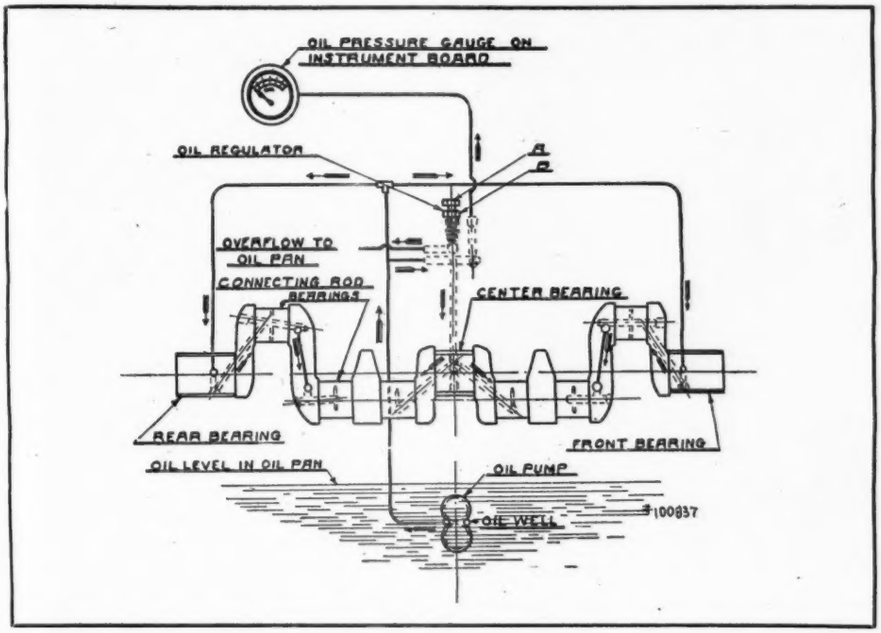
6—Is the pump shaft driven at the right speed for the Bosch magneto?

6—Yes, it turns engine speed which is correct for a four-cylinder magneto.

7—We would like to use the Moon type radiator shell for the front and have hood made up to fit the body lines. Would also like to mount small tank in rear over gas tank, as we have mounted the tank in the rear, same as on Buick sport model.—D. Van Orsdol, Minneapolis, Minn.

7—These details will depend on the layout and we can give no recommendation in regard to them.

Oil Pump Gives Insufficient Lubrication



Q—We have a 1919 Oakland six that is causing trouble, due to the oil pump giving insufficient lubrication to all parts of the engine. Can you give us the name of some oil pump that is designed to take the place of the original pump and advise where same may be purchased.—J. N. Neal & Sons, Greene, Iowa.

1—We do not know of any pump designed for replacement service as you suggest and in fact, to the best of our knowledge, there is no need for one, as the pump which is regular equipment on the Oakland engine is properly designed and adequate for the purpose.

Any trouble which you may be experiencing is due to a cause which can be easily remedied. A diagram of the lubricating system is shown herewith and should explain the operation. One possibility is that the fine screen which is used over the oil pump has not been cleaned for some time. This should be washed off with gasoline whenever the oil pan is removed.

Another possibility is that there is too much side play in the gears, that is too much space between the side of the gear teeth and the gearcase or cover. To remedy this condition, the cover should be removed and the housing rubbed on a piece of emery cloth, laid on a smooth surface. This is for the purpose of taking some material from the surface of the housing on which the cover plate is attached, so that when the cover is again installed it will come down closer to the gears and eliminate possible leakage at the side of such gear. The allowable clearance at the side should be .002 in. in other words .001 in. at each side of the gear.

With side clearance thus reduced, the gear type pump cannot help but operate and any trouble in the lubrication system will be found to be due to leakage in the piping or an obstruction in same. If it is possible to disconnect the pipe line at the pump and put air pressure on and at the same time observe all of the piping and connections, it will be possible to see if there are leaks at any of the bends or joints. If this is not possible the piping should be removed inspected and tested for both obstructions and leaks.

In doing this, air pressure will be very effectual as far as locating leakage is concerned. Should the lubrication of the engine be good generally but one connecting rod bearing, for example, show continual lack of lubrication, it would indicate an obstruction in the passage drilled in the crankshaft, which is for the purpose of feeding oil from the main bearings to the connecting rod bearings. This would, of course, require running a wire through these passages and cleaning them out. In conclusion, we would say that your need is not for new parts for the engine but for proper maintenance of the parts already there.

MAGNETO GETS OUT OF TIME

Q—We have had a great deal of trouble with a Bosch DU 6 magneto, on a Chandler 1914 car, getting out of time. It seems as if all mechanical connections are tight. The sprocket on crankshaft seems to be tight, also the sprocket on the shaft that drives the pump and magneto. The chain seems to have a certain amount of slack as required and seems to be in good shape.

We have set this magneto four different times and the owner can drive about a week or two and all at once the car stops and when he tries to start all it does is backfire. The magneto slips so that the rotating distributor brush instead of being on a segment when the engine is in firing position, is about ¼ in. past the segment. What can be the cause of this trouble.—Deig Service Garage, Mt. Vernon, Ind.

1—In checking the timing of a magneto it is always well to observe the interrupter contacts, as they should begin to open with the interrupter housing in the retard position, and at the same time the distributor brush should be on the segment, perhaps having traveled two-thirds of the way across the segment.

Inasmuch as you state that there are keys in every possible coupling and sprocket, it is obvious that what has happened would be an impossibility. It would accordingly appear as if there had been a slip in your observation at some point and we would suggest making a very practical test by taking a pipe wrench and putting it on the coupling right at the magneto with the engine standing still. Try the coupling easily first one way and then the other to see if there is slippage at any particular point. If there is a key sheared or some such condition, it should not require a great deal of effort to make the shaft turn by using a pipe wrench, as it does not require a great deal of torque to drive the magneto.

Another thing occurs to us, and that is that you may not have the proper slack in the chain. This is considered correct when a pressure exerted between sprockets will make the chain sag ½ inch, and if the chain is very loose it may be that the trouble is due to this chain jumping a tooth now and then.

TO CURE OIL PUMPING

Q—How can a Ford engine be cured of pumping oil? Does the vacuum formed under the pistons have anything to do with pumping of oil? How can this vacuum be reduced?—Paul G. Bergstrom, Normal, Ill.

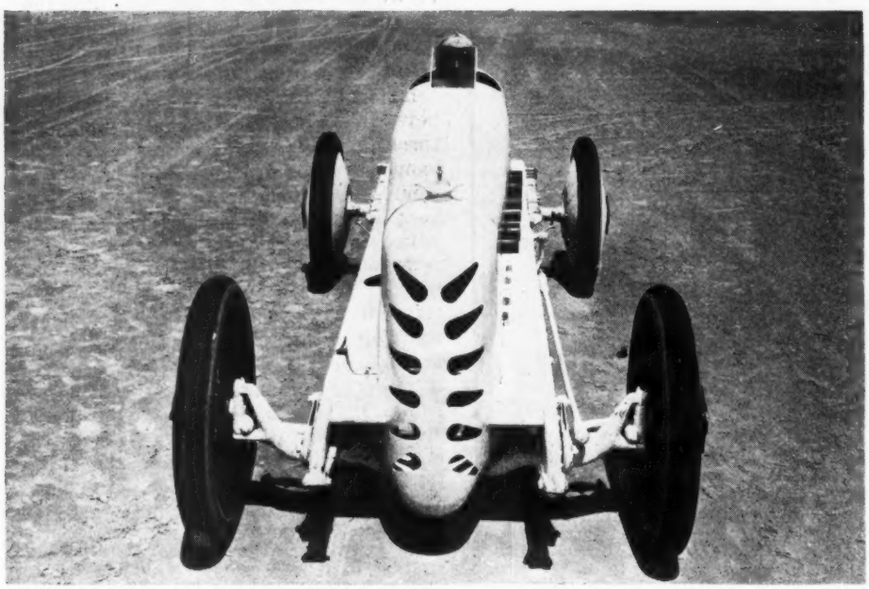
Properly fitted pistons and rings will eliminate oil pumping, assuming the oil level is between the upper and lower pet cocks and nothing has been done to the engine to give it an excessive amount of oil.

It sometimes happens that the piston rings lose their tension although apparently making a perfect contact with the cylinder walls. This means that they do not exert enough force in an outward direction to prevent the oil getting by, and under such circumstances new rings should be used. Scored cylinders will also prevent keeping the oil down, as it will work up into the combustion chamber and foul up the plugs. In the event that new rings are installed it is also well to micrometer the cylinders to see that they are substantially circular, as the variation in diameter taken in different directions should not exceed .003 in.

The diameter of the pistons should be approximately .003 in. less than the diameter of the cylinders, this dimension being taken at the skirt or lower portion of the piston, while at the upper portion a greater clearance is allowed.

The question of vacuum or pressure underneath the pistons has little to do with the condition of oil pumping, as the breather pipe equalizes this internal pressure.

Haugdahl's Wisconsin Special Racer



Balsa wood which is cut and formed to streamline shape is fastened to axles and all protuberances to reduce resistance set up by eddy currents. The space between side rails of frame and body is constructed to form an airfoil

Q—What make of engine does Sig Haugdahl, world's speed king, use in his 3 mile a minute world's wonder car? How many cylinders has this engine? How many revolutions per minute? What is the gear ratio?—Claude Press, Blue Ridge, Texas.

The six cylinder engine used in Sig Haugdahl's Wisconsin special racer is a stock six cylinder Wisconsin aviation engine, a few of which were built by the Wisconsin Engine Co., for the United States Army.

The cylinders' dimensions are 5x6½ and the engine is built almost entirely of aluminum. The steel parts are made of chrome nickel steel. The crankcase, oil pan, cylinders and camshaft housing are made of aluminum. The cylinders are lined with hard steel sleeves, 1/16 inch thick. The cylinders are heated to about 300 degs. Steel sleeves are then inserted and allowed to shrink securely in position, after which they are ground accurately to size. The pistons are of magnesium alloy and the piston pins are allowed to float in both the piston boss and the bushed upper end of the connecting rods.

The valves are 3 inches in diameter and are made of high tungsten steel. The inlet and exhausts are interchangeable. There is one inlet and one exhaust valve per cylinder. The lift of the valves is ½ in. These valves are seated on cast iron rings which are cast directly in the cylinder blocks. The valves are set into the heads of the cylinders at an angle of 25 degs. from the perpendicular and are operated by an overhead camshaft and rocker levers.

All of the bearings in the engine are of the plain babbitt lined bronze type. The camshaft is driven by a vertical shaft at the front end of the engine through two sets of bevel gears. Two magnetos are used and these magnetos are located crosswise of the engine at the front end and are driven by a pair of helical gears from the vertical shaft. Two spark plugs are used to each cylinder. Two carbureters are used on the engine, one for each set of three cylinders.

The oiling system is the regular Wisconsin force feed. In this system, oil is taken from the sump and pumped to the main bearings, then through drilled holes in the crank arm to the connecting rods. An oil lead also supplies the overhead camshaft and the excess oil from this camshaft housing is lead back into the crankcase. The cylinders are lubricated from the oil which is thrown off from the crankshaft after it is forced out of the ends of the bearings.

The cylinders are water cooled. A centrifugal pump is driven off the lower end of the vertical shaft at the front end of the engine and this delivers water to the three cylinder blocks. The cylinder blocks have aluminum jackets cast integral with the barrels. The weight of the engine is 610 pounds and the displacement 764 cubic inches. It turned up at the rate of 2667 r.p.m. during the 3 mile a minute record run and held this speed for practically 20 seconds.

It is estimated that the slippage on the car was less than 3 per cent, the fact being credited to the low wind resistence of the machine. Much attention was paid to the stream lining of the body, axles, springs and wheels. No protuberances were left at any point to break through the air and even the brake drums were covered by the wheel disks.

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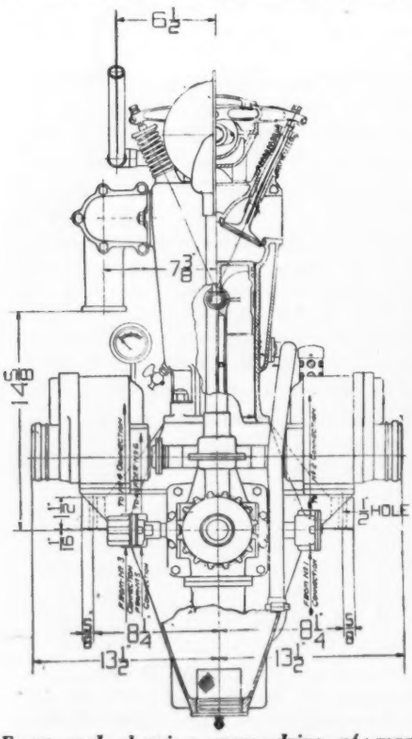
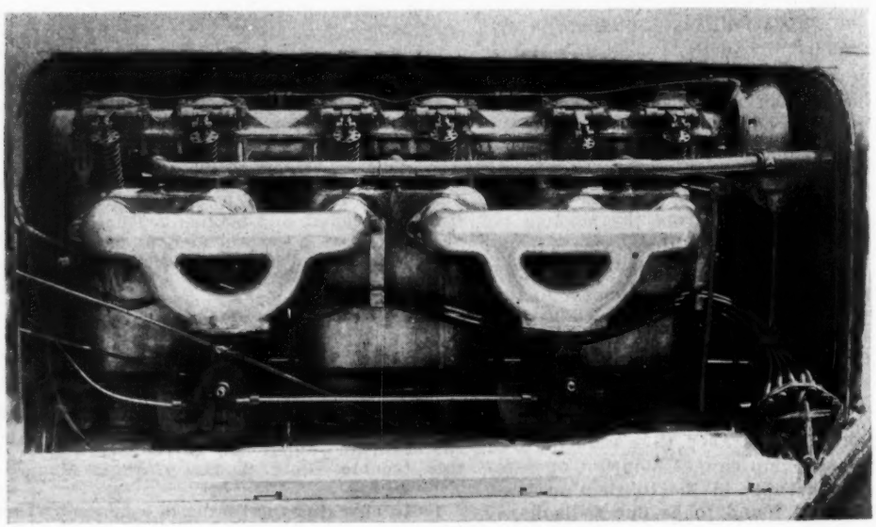


Front end showing cross drive of magnetos. Note narrowness of cylinders



Inlet side of Wisconsin Aviation engine

Rewinding Delco Starter Generator

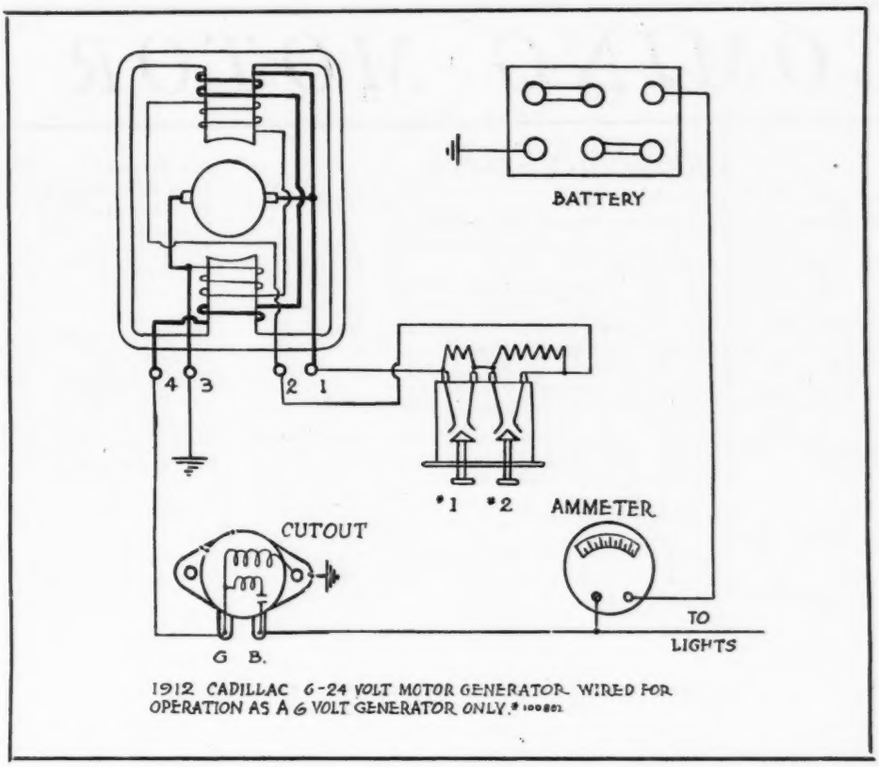
Q—We have a 1912 Cadillac equipped with a Delco Starter Generator, and we would like to change the windings on this so that we can use a six volt battery instead of the present 24 volt battery. If this can not be done we would like to know the best way to adapt this for use as a six volt generator only, in which case we will crank the engine by hand.—Anderson Bros. Garage, Hamilton, Wis.

We do not think it is possible to rewind this machine for operation as a six volt starter, and even if this were done, it would be quite expensive. If you are especially anxious to have the starter feature, suggest writing to the Dayton Engineering Laboratories at Dayton, Ohio, as it is possible that they can rebuild this machine, although we have our doubts.

There is no question, however, but what the method illustrated in the diagram above will do very well for all requirements except starting. The No. 3 terminal, being one side of the armature as well as one end of the shunt field, is shown grounded, the No. 1 terminal being the connection from the live generator brush.

Connecting No. 1 and No. 2 together might give too much charging current to the battery, so the regulating two gang switch is recommended with the resistance coils of iron or German silver wire on the back. It will be seen that the coil on No. 1 switch is shorter than the coil on No. 2. In operation, both switch buttons are pushed in for low speed, and if at high speed the current to the battery is too great, the No. 1 button is pulled out.

If this does not regulate enough, it is pushed in and No. 2 pulled out and if this is not sufficient, both buttons can be pulled out, throwing all of the resistance in series with the shunt field. If this should not be enough resistance it would be necessary to rewind these resistances with coils of greater length or with smaller wire. Lights and ignition circuits can both be connected to the side of the ammeter on which a wire is shown marked "To lights." Any standard six volt cutout can be used.



1912 CADILLAC 6-24 VOLT MOTOR GENERATOR WIRED FOR OPERATION AS A 6 VOLT GENERATOR ONLY.* 100881

Continued from preceding page

The body at the widest point was just 20 inches, allowing only enough room for the driver to squeeze into the seat.

Originally the car was equipped with a sharp nose with a 5 inch opening for cooling purposes. It was found unsatisfactory during a high speed test as it made driving difficult and tended to force too much air through the radiator. An oval shell was constructed and in the first test was found to be the ideal design. The cut shown herewith shows the shell which was used during the record-breaking trial.

Smooth driving was assisted by the elevation of the rear end to a point about 4 inches higher than the radiator. The space between the body and the side members of the frame was constructed in the form of an inverted airfoil and carried the air pressure reaction which tended to force the chassis down on the ground instead of lifting it. It has been calculated that the depressing effect of this air foil on either side was well in excess of 170 pounds.

The car was equipped with 32x4½ in. tires, and had a gear ratio of 1 2/5 to 1.

EXAMINE CENTER CAMSHAFT BEARING

Q—We have a 4-34 Model Briscoe car which has a very noisy engine after having been driven 6,000 miles. The valve lifters seem to give most of the trouble, however, there is a dull thud when the engine is idling which seems to come from the timing gears. The mechanics have failed to remedy the trouble. The engine had new valve lifters and bushings installed about ten months ago, however, the valve noise was never eliminated.

The factory advised having the valves adjusted at the high point, but the mechanics say that this cannot be done. Advise what they mean by adjusting the valves at the high point. The engine seems to have plenty of compression and good power; however, it is very noisy at all speeds except when pulling hills. Advise what to do to eliminate the excessive noise and advise if laminated valves and fiber timing gears will help to reduce the noise. —W. M. Pater, Hoberg, Mo.

The Briscoe model 4-34 has a distinctive tappet noise which is slightly louder than the average run of engines. However, where the noise is very pronounced it can be reduced so that the engine will operate as quietly as it originally did when new. We would suggest that the camshaft be removed after carefully noting whether the camshaft bearings are tight fit in the cylinder casting.

Special attention should be given the center camshaft bearing, which we understand is most addicted to looseness. A loose center camshaft bearing will produce exactly the same noise that you have been complaining of, and providing that the valve lifters and bushings and valve stem bushings are not excessively worn, the replacement of the center camshaft bearing should entirely eliminate the noise. The installation of silent type composition timing gears should entirely eliminate the thud or timing gear knock which you refer to. We do not believe that it is necessary to install laminated valves in order to secure quiet operation of the engine

Adjusting the valves at the high point in this case means that the factory assumed that the cam has worn at some portion on its contour and that the valves should be set when the cam follower is on the highest point on the closed portion of the cam, that is, the place where there is the least clearance. At this point the .003 or .004 of an inch recommended clearance should be allowed.

To determine the high point it would be necessary to have one man crank the car while another inserted either a thickness gage or a piece of paper of the desired thickness between tappet and valve stem and at the point where the clearance is smallest will be the high point of the came. Of course this means on that portion of the cam which has no lift, the neutral or closed position, as it might be called. In other words, the point on the neutral contour of the cam or no lift portion of the cam where the clearance between tappets and valves is the smallest.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Bridgeton, N. J.	Closed Car Show	Nov. 25-Dec. 2
New York	Eighteenth Annual Automobile Salon	Dec. 3-9
New York	Annual Show	Jan. 6-13
New York	National Automobile Body Builders' Show	Jan. 8-13
Oakland, Cal.	Fifth Annual Show	Jan. 13-20
Buffalo	Annual Automobile Show	Jan. 13-20
Hudson, N. Y.	Annual Automobile Show	Jan. 16-20
Cleveland, O.	Annual Winter Show, Cleveland Automobile M'f'r's' and Dealers' Assn.	Jan. 20-27
Milwaukee	Annual Automobile Show	Jan. 20-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Chicago	Annual Automobile Salon	Jan. 27-Feb. 3
Ann Arbor, Mich.		Jan. 29-Feb. 3
Portland, Ore.	Annual Automobile Show	Feb. ..
Atlanta	Annual Automobile Show	Feb. ..
Minneapolis, Minn.	Annual Show	Feb. 3-10
Troy, N. Y.	Annual Automobile Show	Feb. 3-10
Charlotte, N. C.		Feb. 5-10
Lansing, Mich.		Feb. 5-10
Waterbury, Conn.	Annual Automobile Show	Feb. 5-12
Toledo	Annual Automobile Show	Feb. 5-10
Waterbury, Conn.	Annual Automobile Show	Feb. 5-12
Cincinnati	Automobile Show	Feb. 7-14
Kansas City, Mo.	Annual Automobile Show	Feb. 10 17
Kalamazoo, Mich.		Feb. 12-17
Flint, Mich.		Feb. 12-17
San Francisco	Exposition, Auditorium	Feb. 17-24
Gr'd Rapids, Mich.		Feb. 19-24
Mt. Clemens, Mich.		Feb. 19-24
Louisville	Annual Automobile Show	Feb. 19-24
Des Moines, Ia.	Annual Show	Feb. 23-Mar. 3
Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Association	Feb. 24-Mar. 3
Muskegon, Mich.		Feb. 26-Mar. 3
Syracuse, N.Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Bay City, Mich.		Mar. 5-10
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Washington, D. C.	Spring Show, Convention Hall	Mar. 11-17
Port Huron, Mich.		Mar. 12-17
Battle Creek, Mich.		Mar. 19-24
Alpena, Mich.		Apr. 2-7

CONVENTIONS

Chicago	Annual Meeting, Automotive Electric Service Association	Jan. 29-31
Toledo	Annual Convention of the Ohio Automotive Trades' Assn.	Dec. 6-8
Indianapolis	Annual Convention, Indiana Automotive Trade Association	Dec. 12
Quincy, Ill.	Annual Meeting Illinois Automotive Trade Association	Mar. 19

RACES

Los Angeles, Calif.	Nov. 30
San Diego, Calif.	January

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

THE LOOSED FLOOD

Advertising pays—the newspapers.

It helps also to swell the postal receipts, and it has been known to keep the garage man from the door of the artist who knows how to make silk stockings assume shapes they never attain outside of magazine back covers.

As to its further productiveness, I know only this:

Having a Palestine Four to dispose of, I announced that fact in the classified columns of a daily paper, offering my machine to any buyer at his own price. In reply I received the following:

Circular from the Abandon Ship Insurance Company, offering me a favorable policy which would cover all accidents involving perambulators between 9 p. m. and 4 a. m. Rate, $17.86 per annum.

Form letter asking me to join the newly formed Association of Motorists with Chronic Dyspepsia and a Cast in the Left Eye. Dues, $10.00 yearly.

Bill for $28.75 from a milliner who had lost my address.

Booklet giving motor routes to Canada and Quebec quotations on case goods.

Telephone call from friend whose car was in the shop and who thought, since I was going to dispose of mine and had no present use for it, I wouldn't mind . . . . . he was only going to run up to Buffalo, anyway.

Notice from official sources that I would have to renew my license within fifteen days.

Price list from the Broken Chains Tire Company.

Sixty-three (63) prospectuses from oil companies.

Thirty-one (31) offers of stock in automobile firms that were going to put Henry Ford out of business.

Twelve (12) letters from real estate firms which mistakingly presumed that I was interested in choice building lots.

No (0) offers to buy my automobile. —J. K. M.

Number of horses in New York has decreased 75,000 in the past four years. It sometimes seems as though horse sense has decreased at about the same ratio.—New York American.

Yes, but now we have speed mania.

A pressure of 15 pounds on this wire bumper throws out the clutch, applies the brakes, cuts off the ignition and blows the horn.—From the *Scientific American*. It seems to do about everything except rock the baby to sleep.

"Motor Car Now Runs Everywhere on Globe."
—Trade Journal caption.

The automobile salesman might revise the famous old song to read:

"From Greenland's icy mountains
to India's coral strands
They call us to deliver
New cars of well-known brands."

Squeeks & Rattles, Inc.,
Chicago, Ill.
Gentlemen:

Now look here, you guys have been going just a bit too far. I don't mind a little kidding but when you start to get personal, then its time I made a run and jump for it. I have read with great patience the accounts of your contributors who have been making bids at my title of being the champion inventor in the automotive world today.

I ask you, what was it that made Milwaukee famous? What great man immortalized the name of Broadway? What is it that you should have after every meal? Who wrote the famous Scouring Song from the Opera, Lux? In what confection do you get a valuable prize with each and every package?

Can you think of any of those famous things without also figuring me in? I have always been modest about the great good which I have done for the millions of drivers of automobiles in the world today, but now with a flock of know-littles making frantic jabs at my supremacy, I come forward again with the story of my invention—it is named after me, you cannot think of a puncture without thinking of me—what is it? The Jack.

And this is the story that goes with the invention of the Jack. I was driving along one day in one of the first automobiles made, when suddenly from behind came a noise which would make the blowing up of the Maine sound like the ticking of a clock. I got out and looked, and there was the first blow-out known to the history of automobile tires.

Naturally, the question arose at once: "How will I get the darned thing off?" Seizing a stick of wood which lay close by, I crawled under the axle and slowly started to breathe. With each breath, the car jumped up another inch and as it did, I would brace it with the stick. Soon, I found myself gasping and fearing lest I should pass away, I gave a mighty heave with my chest and threw the car over in the ditch. Never mind what kind of language I used, my name has gone down in history as the inventor of the jack and people have done me tribute since that day.

You may send the India rubber socket wrench to

JACK CASS, Jackson, Miss.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾–1	$1650a	3¾x5	34x5n	34x5n	W
Acason RB	1½	1950	3¾x5¼	36x3½	36x6	W
Acason H	2½	2750	4⅜x5⅜	36x4k	36x8k	W
Acason L	3½	3450	4⅜x5¾	36x5k	36x10k	W
Acason M	5	4350	5 x3¼	36x6	40x12	W
Ace	1½–1½	2400	3⅝x5	34x3½	34x6	W
Ace	2	2850	4⅛x5¼	36x4	36x7	W
Ace	2½–3	3400	4⅛x5¼	36x4	36x8	
Acme	1	....	3¾x5	35x5n	35x5n	W
Acme	1½	....	3¾x5	34x3½	34x5	W
Acme	2	....	3¾x5	34x3½	34x5	W
Acme	3	....	4⅛x5¼	36x4	36x7	W
Acme	4½	....	4½x5½	36x4	36x7k	W
Acme	6¼	....	4½x5½	36x5	40x10	W
Acme	4½	....	4⅝x6	36x6	40x12	W
American	2½	3350	1 x6	36x4k	36x4dk	W
American	4	4275	4½x6	36x5k	36x5dk	W
American	5	4500	4½x6	36x5	36x12	W
Armleder	1	....	3¾x5¼	34x3½k	34x6k	W
Armleder	1½	....	3¾x5¼	34x3½k	34x6k	W
Armleder	1½	....	4¼x5½	34x3½k	34x6k	W
Armleder	2½	....	4¼x5½	36x4k	36x7k	W
Armleder	3½	....	4½x5¼	36x4k	36x7k	W
Armleder	3½	....	4½x6	36x5k	36x5dk	W
Armleder	5	....	4½x5½	36x5k	36x6dk	W
*Atlas	1	1495	3¾x5½	34x4½n	34x4½n	W
*Atlas	1½–2	1950	3¾x5½	36x6n	36x6n	W
Atterbury	1½	2175	3¾x5	34x3½	34x5	W
Atterbury	2½	3375	4⅛x5¼	36x4	36x4d	W
Atterbury	2½	3475	4½x5¼	36x4	36x4d	W
Atterbury	3½	4275	4½x5½	36x5	40x5d	W
Atterbury	3½	4375	4½x5½	36x5	40x5d	W
Atterbury	5	4975	4⅝x6	36x5	40x6d	W
Atterbury	5	5125	4⅝x6	36x5	40x6	W
Autocar	1½–2	1950	4¾x4½t	34x4k	34x6	D
Autocar	1½–2	2050	4¾x4½t	34x4k	34x6	D
Autocar	2–3	2950	4 x5½	34x5	36x7	D
Autocar	2–3	3075	4 x5½	34x5	36x7k	D
Autocar	4–6	3950	4½x5½	34x6	36x12	D
Autocar	4–6	4100	4¼x5½	34x6	36x12	D
Available	H1½	2475	4 x5	36x3½k	36x5k	W
Available	H2	2775	4 x5	36x3½k	36x6k	W
Available	H2½	3160	4 x5	36x4k	36x8k	W
Available	H3½	4175	4½x5½	36x5	40x5d	W
Available	H5	5375	5 x6	36x6	40x12	W
*Avery	1	....	3 x4s	34x5n	34x5n	I
Beck	A Jr.	1¼	1285a	3½x5	34x4½n	34x4½n
Beck	B-30	1½	1350	3¾x5	34x5	36x6
Beck	C-40	2	1550	3¾x5	36x6	36x6
Beck	D-50	2½	1950	4½x5¼	38x7	40x8
Bell	M (Iowa)	1	1495	3⅝x5½	35x5	35x5n
Bell	E (Iowa)	1½	2100	3¾x5¼	34x3½	34x5
Bell	O (Iowa)	2½	2550	4½x5½	34x4	34x6
Bessemer	G	1	....	3½x5	35x5n	35x5n
Bessemer	H-2	1½	....	3¾x5	36x3½	36x5
Bessemer	J-2	2½	....	4½x5½	36x4	36x4d
Bessemer	K-2	4	....	4½x5½	36x5	36x10
Bethlehem	KN	1	1195	3½x5	35x5n	35x5n
Bethlehem	GN	2	1795	4 x5½	34x4	34x6k
Bethlehem	GN	3	2495	4 x6¼	36x4k	36x8k
Bridgeport	A	1½	....	3¾x5½	34x3½	34x6
Bridgeport	B	2½	....	4½x5½	36x4	36x4d
Bridgeport	C	3½	....	4½x6	36x5	36x10
Brinton	C	2	2500	3¾x5	34x4	34x5
Brinton	D	3	2975	4⅛x5¼	36x4	36x7
Brockway	E	1	....	4 x5	33x5n	33x5n
Brockway	S-5	1½	....	4 x5	36x4	36x6
Brockway	SK	1½	....	4⅛x5¼	36x4	36x6
Brockway	KR	2½	....	4½x5½	36x4	36x8
Brockway	K-5	2½	....	4⅛x5¼	36x4	36x8
Brockway	RT	3½	....	4¾x6	36x5	36x10
Brockway	R-4	3½	....	4½x5½	36x5	36x5d
Brockway	T-4	5	....	4¾x6	36x6	40x6d
*Buick	½	945b	3⅜x4¾	31x4n	31x4n	B
Case	2	....	4¼x5¾	36x6	38x7	I
*Chevrolet	¼	510b	3⅛x4	30x3½n	30x3½n	B
*Chevrolet	G ¾	650	3⅛x4	34x4n	34x4½n	B
*Chevrolet	T 1	1095	3⅛x5¼	33x4n	35x5n	W
Chicago	C1½	1½	....	4 x5	36x3½k	36x5k
Chicago	C2½	2½	....	4 x5	36x4k	36x7k
Chicago	C3½	3½	....	4½x5½	36x5	36x10
Chicago	D5	5	....	4½x5½	36x6	40x12
Clydesdale	10	¾–1½	1485	3¾x5	34x5n	34x5n
Clydesdale	10A	¾–1½	1535	3¾x5	34x5n	34x5n
Clydesdale	18	¾–1½	1890	3¾x5	34x5	34x5
Clydesdale	20	1–1½	2385	3¾x5	34x5	34x5k
Clydesdale	42	1½–2	2475	3¾x5	36x3½	36x6
Clydesdale	65X	2½–3	3250	4¼x5¼	36x4	36x8
Clydesdale	65EX	2½–3	3450	4½x5½	36x4	36x8
Clydesdale	90	3½–4½	4100	4½x5½	36x5	36x10
Clydesdale	120	5–6	4500	4⅝x6	36x6	40x12
Comet	T	1½	1950	3¾x5	34x4	34x4
Commerce	9	¾–1½	1150	3¾x5	32x4½n	32x4½n
Commerce	T	¾–1½	1450	3¾x5	34x4½n	34x4½n
Commerce	10	¾–1½	2500	3¾x5	33x5n	33x5n
Commerce	12	1½	1695	3¾x5	34x3½	34x4
Commerce	12	1½	1800	3¾x5	35x5n	35x5n
Commerce	16	2	1995	3¾x5	34x4	34x6
Commerce	16	2	2150	3¾x5	35x5n	36x6n
Commerce	18	2½	2150	4½x5¼	36x4	36x7
Commerce	18	2½	2495	4½x5¼	36x6n	40x8n
Commerce	25	2½	2425	4½x5¼	36x4	36x7
Commerce	25	2½	2770	4½x5¼	36x6	40x8n
Cook	51	2½	3600	4 x5⅛	36x6n	40x8n
*Corbitt	¾–1	1250	3½x5	33x5n	33x5n	
Corbitt	E-22	1	1480	3⅜x5	34x3½	34x4
Corbitt	D-22	1½	2200	3⅜x5	34x3½	34x5
Corbitt	C-22	2	2600	4½x5¼	36x3½	36x7
Corbitt	B-22	2½	3000	4½x5¼	36x4	36x7
Corbitt	R-22	3	3200	4½x5½	36x4	36x8
Corbitt	A-22	3½–4	3800	4½x5½	36x5	36x10
Corbitt	AA-22	5	4500	4¾x6	36x6	40x6d
Day-Elder	AS	1	1600	3¾x5	35x5n	35x5n
Day-Elder	B	1½	2000	3¾x5	34x3½	34x5
Day-Elder	D	2	2400	4½x5¼	36x4	36x7
Day-Elder	C	2½	2750	4½x5½	36x4	36x7
Day-Elder	F	3½	3150	4½x5½	36x5	36x5d
Day-Elder	E	5	4250	4½x6	36x5k	40x6dk
Dearborn	E	1	1600	3⅝x5⅛	35x5n	35x5n
Dearborn	FX	1½	2300	3⅝x5⅛	34x4	34x5
Dearborn	F	1½	2180	3⅝x5⅛	34x4	34x5
Dearborn	48	2	2590	3⅝x5⅛	34x4½n	34x7
Defiance	G	1	1525	3¾x5	35x5n	35x5n
Defiance	D	1½	1845	3¾x5	35x5n	36x6n
Defiance	E	2	2075	3¾x5	35x5n	38x7n
Denby	31	1¼	1485	3¾x5	35x5n	35x5n
Denby	33	1½	2145	3¾x5	35x5n	38x7n
Denby	35	2½–3	2795	4½x5¼	36x4	36x7
Denby	27	4	3895	4½x5½	36x5	36x5d
Denby	210	5	4295	4½x5½	36x6	40x6d
Dependable	A	¾–1	1650	3⅜x5	34x5n	36x6n
Dependable	C	2	2350	3⅜x5¼	34x3½	34x5
Dependable	D	2½	2650	4 x5½	36x5	36x6
Dependable	E	3	2950	4½x5½	36x4	36x7
Diamond T	O-3	1–1¼	1975	3⅜x5¼	36x3½n	36x4n
Diamond T	T	1½	2250	3⅜x5¼	36x3½	36x5
Diamond T	U	2–2½	2650	4 x5¼	36x4	36x7
Diamond T	K	3½	3750	4½x5½	36x5	36x5d
Diamond T	EL	5	4325	4½x5½	36x6	40x6d
Diamond T	S	5	4500	4¾x6	36x6	40x6d
Doane		2½	4100b	4½x5¼	36x5	36x7
Doane		3½	5100b	4⅝x5¾	36x5	36x5d
Doane		6	6900b	5 x6¼	36x6	40x6d
*Dodge Brothers		¾	730	37⅝x4½	32x4n	32x4n
Dorris	K-2	1	2490	4 x5½	33x5n	33x5n
Dorris	K-4	2–2½	3400	4½x5½	36x4	36x7
Dorris	K-7	3½	4400	4½x5½	36x5	36x10
*Dort	103	½	685a	3½x5	31x4n	34x4n
Double Drive	B	3	4000	4½x5½	36x6	36x6
Duplex	A	2	2775	4 x5¼	35x5n	38x7n
Duplex	E	3½	3500	4½x5½	36x8	36x8
Duty	22	2	1590	3½x5	34x3½	34x5
Eagle	101	1½	1875	3⅝x5⅛	34x5	34x5
Eagle	100-2	2	2275	3⅜x5¼	34x4k	34x7k
F. W. D.	B	3	4200	4¾x5½	36x6	36x6
Fageol	1½	1½	3000	3⅜x5¼	34x3½k	34x6k
Fageol	2½	2½	3900	4⅜x5¾	34x4	36x7
Fageol	3½	3½	5000	4½x6¼	36x5k	40x5dk
Fageol	5	5	5700	4½x6¼	36x6	40x6d
Fargo	R	2	1700	3¾x5	34x4	36x6
*Federal		1½	1375	3¾x5	—x5n	—5n
Federal	SD	1½	1800	3¾x5	35x5n	36x6n
Federal	TE	1½	2175	4½x5¼	36x3½	36x5
Federal	UE	2–2½	2425	4½x5¼	34x4	36x7
Federal	WE	3½–4	3150	4½x5½	36x5	36x5d
Federal	X2	5–6	4500	4¾x6	36x6	40x6d
*Ford	TT	1	380	3¾x4	30x3½n	32x4½n
Front Drive	C	1½	2800	3¾x5½	36x6	36x6
G.M.C.	K16	1	1295	3½x5½	34x5n	34x5n
G.M.C.	K-41A	2	2375	4 x5½	36x4k	36x7k
G.M.C.	K-41B	2	2375	4 x5½	36x4k	36x7k
G.M.C.	K-41T	5†	2450	4 x5½	36x4	36x8
G.M.C.	K-71A	3½	3600	4½x6	36x5	40x5d
G.M.C.	K-71B	3½	3700	4½x6	36x5	40x5d
G.M.C.	K-71T	10†	3700	4½x6	36x5	40x12
G.M.C.	K-101A	5	3950	4½x6	36x5	40x6d
G.M.C.	K-101T	15†	4050	4½x6	36x5	40x14
G.M.C.	K-101B	5	4050	4½x6	36x5	40x6d
G.W.W.		1½	1850	3¾x5½	35x5	35x5
*Garford	15	1	1590	3⅝x5½	34x5n	34x5n
Garford	25-B	1½	1990	3¾x5½	36x3½	36x5
Garford	70-H	2½	2750	4¼x5½	36x4	36x8
Garford	77-D	4	3750	4½x6	36x5	36x5d
Garford	68-D	5	4500	5 x6½	36x6	40x5d
Garford	150-A	7½	5200	5 x6½	36x6	40x7d
Gary	F	1–1½	1775	3¾x5	36x3½	36x5
Gary	I	2	2450	4 x5½	36x3½	36x6
Gary	J	2½	2850	4¼x5½	36x4	36x8
Gary	K	3½	$3790	4½x6	36x5	40x5d
Gary	M	5	4450	5 x6½	36x6	40x6d
Gersix	M	1½	3100	4 x5½	36x3½	36x7
Gersix	K	2½	3500	4½x5½	36x4	36x8
Gersix		3½	4500	4½x6	36x5	40x12
Gotfredson	20	1	2075	3¾x5½	34x5	31x5
Gotfredson	31	1½–2	3000	4 x5¼	36x6	38x7n
Gotfredson	A	2½	3375	4 x5¼	36x4	36x7
Gotfredson	B	3½–4	4475	4½x5½	36x5	36x10
Gotfredson	100	5–6	5500	5 x6½	36x6	40x11
Graham Bros.		1	1265	3⅞x4½	33x4½n	34x5n
Graham Bros.		1½	1325	3⅞x4½	33x4½n	36x6n
[4]Gramm-Pion.	10	1	1245	3½x5	33x5n	33x5n
[1]Gramm-Pion.	15	1½–2	1750a	3¾x5	36x3½k	36x5k
[1]Gramm-Pion.	6	1½–2	2250a	3¾x5	36x3½k	36x5
[1]Gramm-Pion.	20	2–2½	2475a	4½x5½	36x4k	36x7k
[1]Gramm-Pion.	30	3	3300a	4¼x5½	36x5k	36x5dk
[1]Gramm-Pion.	75P	3½	4225a	4½x5½	36x6n	42x9n
[1]Gramm-Pion.	40	4	3850a	4½x5½	36x5	36x5dk
[1]Gramm-Pion.	50	5–6	4450a	4¾x6	36x6	40x6dk
Hall	1½	1½	3100	3¾x5	34x5n	38x7n
Hall	2½	2½	3275	4½x5¼	36x4	36x6
Hall	3½	3½	4100	4½x5½	36x5	36x5d
Hall	5	5	5100	4½x5½	36x5	40x6d
Hall	7 chain	7	5100	4½x5½	36x5	40x6d
Harvey	W OA	2	2650	4¼x5½	34x4	34x7
Harvey	WFA	2½	2950	4¼x5½	36x4	36x7
Harvey	WHA	3½	3950	4½x6	36x5	36x5d
Hawkeye	O	1	1375	3⅝x5⅛	34x5n	34x5n
Hawkeye	K	1½	1645	3¾x5¼	34x3½k	34x5k
Hawkeye	M	2	2145	4¼x5	36x4k	30x6k
Hawkeye	N	3½	3700	4½x6¾	36x5k	36x10k
Hendrickson	O	1½	2200	3⅝x5⅛	36x4n	36x5n
Hendrickson	N	2½	2690	4¼x5¾	36x4k	36x7k
Hendrickson	M	3½	3000	4¼x5	36x5k	36x5dk
Hendrickson	K	5	4000	5 x6¼	36x6	40x6
Huffman	B	1½–2	1795	3¾x5	34x3½	34x6
Huffman	C	1½–2	1695	3¾x5½	36x3½	36x6
Huffman	D	2–3	2895	4¼x5½	36x4	36x7
Hurlburt	A-A	1–1½	1950	3¾x5	34x5n	34x5n
Hurlburt	B-B	2–2½	2800	4¼x5½	36x4	36x4d
Hurlburt	C-C	3–3½	3475	4¼x5½	36x5	36x5d
Hurlburt	D-D	4–4½	4150	4½x6	36x5	36x6d
Hurlburt	E-E	5–6½	4850	4¾x6½	36x6	40x6d
Indep'd't(Iowa)	E	1	1665	3½x5	34x3½	34x4
Indep'd't(Iowa)	G	1½	2040	3¾x5¼	34x3½	34x5
Indep'd't(Ia.)	H1	2½	2940	4½x5¼	36x4	36x7
*Indiana	10	1	....	3¾x5¼	34x5n	34x5n
Indiana	12	1½–2	....	3¾x5½	34x3½k	34x5k
Indiana	20	2	....	4½x5½	36x4k	36x7k
Indiana	25	2½–3	....	4½x5½	36x4k	36x8k
Indiana	35	3½–4	....	4⅝x5½	36x5k	36x5dk
Indiana	51	5–7	....	5 x6¼	36x5k	40x6dk
*International	S	1	1250	3½x5	32x4½n	32x4½n
International	21	1	1550	3½x5¼	36x3½k	36x3½
International	31	1½	1650	3½x5¼	36x3½k	36x5k
International	41	2	2100	3½x5¼	36x3½k	36x6k
International	52	2½	3500	4¼x5	36x6n	36x6dn
International	61	3	2400	4¼x5	36x4k	36x7k
International	62	3	2600	4¼x5	36x4	36x7
International	101	5	3600	4¼x5	36x5	40x12k
International	102	5	3800	4¼x5	36x5	36x12
Jackson	4WD	3½	3850	4½x5½	36x7	36x7
K-Z	1	1	1750	3½x5	34x3½	34x5
K-Z	1½	1½	2075	3¾x5	36x4	36x6
K-Z	2½	2½	2550	4¼x5¼	36x4	36x8
K-Z	3½	3½	3350	4½x5½	36x5	40x10
K-Z	5	5	3850	4½x5½	36x6	40x6d
Kalamazoo	T	1	1295	4 x5	34x5	34x5n
Kalamazoo	G-1	1½	1800	3¾x5	34x4	34x5
Kalamazoo	LG	2	2645	4 x5	36x4	36x7
Kalamazoo	NH	3	3145	4 x6	36x5	36x10
Kalamazoo	HD	3	3350	4¼x6	36x5	36x10
Kalamazoo	SK	4	3845	4¼x6	36x5	36x12
Kalamazoo	OK	5	4350	4½x6	36x6	40x6d
[2]Kelly-S.	K-31	1½	2700	3¾x5¼	36x3½	36x6
[2]Kelly-S.	K-34	1½	2700	3¾x5¼	36x3½	36x6
[2]Kelly-S.	K-38	2½	2900	3¾x5¼	36x4	36x4d
[2]Kelly-S.	K-35	2½	2900	3¾x5¼	36x4	36x4d
[2]Kelly-S.	K-40	3½	3900	4½x6½	36x5	40x5d
[2]Kelly-S.	K-41	3½	3900	4½x6½	36x5	36x10
[2]Kelly-S.	K-42	3½	3900	4½x6½	36x5	40x5d
[2]Kelly-S.	K-50	5	4400	4½x6½	36x6	40x6d
[2]Kelly-S.	K-60	6	4600	4½x6½	36x6	40x7d
[2]Kelly-S.	K-61	5–7	4800	4½x6½	36x6	36x7d
Kimball	AB	2	3675	4 x6	36x4	36x7
Kimball	AC	2½	3975	4¼x6	36x4	36x8
Kimball	AK	3	4500	4½x6	36x4	36x10
Kimball	AE	4	5000	4¾x6	36x5	40x12
Kimball	AF	5	5500	5 x6	36x6	40x7d
*Kissel	Express	1	1585	37⅛x5½	34x5n	34x5n
Kissel	Utility	1½	1975	37⅛x5½	36x3½	36x6
Kissel	Freighter	2½	2875	4¼x5½	36x4	36x8
Kissel	H.D.	4	3675	4¼x5½	36x5	36x12
Kleiber	AA	1	2200	4½x5¼	34x3½k	34x5k
Kleiber	A	1½	3100	4½x5¼	36x3½k	36x6k

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.

r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor. †Capacity with semi-trailer.

1—Gramm Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kleiber.....BB	2	$3600	4½x5¼	36x4k	36x7k	W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W
Koehler.....D	1½	2150	3½x5	34x3½	34x5	W
Koehler.....M	2½	3175	4 x5½	36x4	36x7	W
Koehler.....MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W
Koehler,MT.Trac	5	3275	4 x5½	36x4	36x7	W
Krebs.....23	¾	1360	3¾x5	34x4½	34x4½	B
Krebs.....24	1	1675	3¾x5	34x5	34x5	W
Krebs.....45	1½	2275	4½x5¼	36x4	36x7	W
Krebs.....75	2½	2550	4½x5½	36x4	36x8	W
Krebs.....110	3½	3175	4½x5½	36x5	40x10	W
Krebs.....140	5	....	4¾x6	36x6	40x6d	W
Larrabee.....X-2	1	1925	3¼x4½	34x5n	34x5n	B
Larrabee.....U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee.....J	1½–2½	2400	3¾x5	34x3½k	34x5k	W
Larrabee.....K	2½–3	3100	4½x5¼	36x4	36x7	W
Larrabee.....K-5	2½–3½	3450	4½x5½	36x4	36x8	W
Larrabee.....L-4	3½–5	4000	4½x5½	36x5	36x5d	W
Larrabee.....W	5–7	4800	4¾x6	36x6	40x6d	W
Maccar.....L	1½	....	4½x5¼	36x4	36x6	W
Maccar.....H-A	2	....	4½x5¼	36x4	36x4d	W
Maccar.....H-2	3	....	4½x5½	36x4	36x5d	W
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W
Maccar.....G	5–6	....	4¾x6	36x5	40x6d	W
MacDonald.....A	7½	5750	4½x6	40x7	40x14	I
Mack....AB D.R.	1½	3450	4 x5	36x4k	36x3½dk	D
Mack....AB Chain	1½	3000	4 x5	36x4k	36x3½dk	D
Mack....AB Chain	2	3300	4¼x5	36x4k	36x4dk	C
Mack....AB D.R.	2	3750	4¼x5	36x4k	36x4dk	D
Mack....AB D.R.	2½	3850	4¼x5	36x4k	36x4dk	D
Mack....AB Chain	2½	3400	4¼x5	36x4k	36x4dk	C
Mack....AC Chain	3½	4950	5 x6	36x5k	40x5dk	C
Mack....AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack....AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack....AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac....AB	5	3400	4¼x5	36x4	36x4d	C
Mack Trac....AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac....AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac....AC	13	5750	5 x6	36x6	40x12	C
Mack Trac....AC	15	6000	5 x6	36x7	40x7d	C
*Mapleleaf.....**	1½	3000	3¾x5¼	34x5n	36x6n	W
Mapleleaf...AA**	2	3600	4 x5¼	36x4	36x7	W
Mapleleaf...BB**	3	4050	4¼x5½	36x4	36x4d	W
Mapleleaf...CC**	4	4800	4½x5½	36x5	36x5d	W
Mapleleaf...DD**	5	5625	4½x5½	36x6	40x6d	W
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W
Master.....JD	1½	2590	4½x5½	34x3½	34x6	D
Master.....Z	2	2290	4½x5½	34x3½	34x5	W
Master.....W	2½	2890	4¼x5½	34x4	36x8	W
Master.....DD	2½	3190	4¼x5½	34x4	36x7	D
Master.....A	3½	3990	4½x6	36x5	40x8	W
Master.....E	3½	4290	4½x6	36x5	40x5d	D
Master.....Y	4	4490	4½x6	36x5	40x6d	D
Master.....B	5	4990	4¾x6½	36x6	40x6d	W
Master.....F	5	5090	4¾x6½	36x6	40x6d	D
MasterTrac.,DDT	6	3390	4¼x5½	34x4	36x7	D
*Maxwell.....1½	1½	932	3⅝x4¼	32x3n	32x4n	W
*Menominee.....	1	1650	4 x5	34x5n	34x5n	W
Menominee...HT	1–1¼	2000	3¾x5	34x3½	36x5	W
Menominee....H	1½	2475	4 x5	36x3½	36x5	W
Menominee....D	2–2½	2875	4 x6	36x4	36x8	W
Menominee....G	3½	3800	4½x6	36x5	36x10	W
Menominee...J-3	5	4250	4¾x6	36x6	40x12	W
Moline.....10	1½	1985	3½x5	34x5n	36x6n	I
[3]Moreland..R. R.	1	1595	4 x5	34x5n	34x5n	B
Moreland.....BX	1½	1980	4 x5	36x3½	36x6k	W
Moreland.....EX	2	2800	4½x5¼	36x4	36x7k	W
Moreland.....AX	3	3500	4½x5½	36x5	36x10k	W
Moreland.....RX	4½–5	4600	4¾x6	36x6	40x6	W
Nash.....2018	1–1½	1595	3¾x5¼	34x4	34x5	I
Nash.....3018	2–2½	2150	3¾x5¼	34x4k	34x7k	I
Nash.....Quad.	2–2½	2750	4¼x5½	36x6	36x5k	I
Nash. 3018, LWB	2–2½	2200	3¾x5¼	34x4k	34x7k	I
Nash.Quad. LWB	2–2½	2800	4¼x5½	36x6	36x6	I
Nash.....5018	2½	2250	3¾x5¼	31x4k	34x7k	I
[4]Nelson.....G2	1½	....	4½x5¼	36x3½	36x6	W
[4]Nelson.....G3	2½	....	4½x5¼	36x4	36x7	W
[4]Nelson.....G4	3½	....	4½x5½	36x5	36x5d	W
[4]Nelson.....G5	5	....	4¾x6	36x6	40x6d	W
Netco.....DK	2	3100	4½x5¼	36x4k	36x7k	W
Netco.....HL	2½	3500	4½x5½	36x4k	36x8k	W
Niles.....E	2	3000	4½x5¼	36x4k	36x7k	W
Noble.....A21	1¼	1750	3⅝x5⅛	34x5	34x5	W
Noble.....B31	1½–2	2395	3¾x5¼	36x4	36x7	W
Noble.....D51	2½–3	2795	4¼x5½	36x4	36x8	W
Noble.....E71	3½–5	3495	4½x6	36x5	36x10	W
Noble.....B30	1½	....	3¾x5¼	36x3½	36x5	W
Noble.....C40	2	....	4 x5½	36x4	36x7	W
Noble.....D50	2½	....	4¼x5½	36x4	36x8	W
Noble.....E70	3½	....	4½x6	36x5	36x10	W
Northwestern..W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern.WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk.....25E	1	1595	3½x5	34x3½	34x4	W
Norwalk.....35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk,35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
Ogden.....A2	1	....	3½x5	34x5n	34x5n	W
Ogden.....D	1½	....	3¾x5	36x3½	36x5	W
Ogden.....E	2½	....	4½x5½	36x4	36x8	W
Old Hickory...W	1	$1775	3¾x5	36x3½k	36x4k	W
Old Reliable....A	1½	2350	4 x5	34x4	36x6	W
Old Reliable....B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable....C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable....D	5	5000	4¾x6	36x6	40x6d	W
Old ReliableKLM	7	6000	4¾x6¼	36x6	40x7d	C
*Oldsmobile Econ	1	1095	3½x5¼	35x5n	35x5n	I
Olympic.....A	2½	3200	4¼x5½	36x4	36x8	W
Oneida.....B9	1½	2825	4 x5¼	36x3½	36x7	
Oneida.....C9	2½	3200	4 x5¼	36x4	36x8	
Oneida.....D9	3½	4050	4½x5½	36x5	36x10	
Oneida.....E9	5	4725	4½x5½	36x6	40x12	
Oshkosh.....A	2	2485	3½x5	36x6n	36x6n	B
Oshkosh.....AA	2	2585	3½x5	36x6n	36x6n	B
Oshkosh.....B	2½	3485	4 x5½	38x7n	38x7n	B
Oshkosh.....BB	2½	3585	4 x5½	38x7n	38x7n	B
*Overland.....4	½	425	3½x4	30x3½n	30x3½n	B
Packard.....EC	2–3	3100	4½x5½	36x4	36x7	W
Packard.....EX	2–2½	3100	4½x5½	36x6n	40x8n	W
Packard.....ED	3½x4½	4100	4½x5½	36x5	36x5d	W
Packard.....EF	5–7½	4500	5 x5½	36x6	40x6d	W
Paige.....52-13	1½	1950	4 x5¼	34x3½	34x5	W
Paige.....54-20	2½	2420	4¼x5½	34x4	34x8	W
Paige.....51-18	3½	3145	4½x5½	36x5	36x5d	W
Parker.....C-22	1	1875	3¾x5¼	34x5n	34x5n	W
Parker.....G-22	2½	3200	4¼x6	34x4	36x4d	W
Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W
Parker.....M-20	5	4850	5 x6	36x6	40x6d	W
Patriot....Revere	1	1380	3¾x5	35x5n	35x5n	W
Patriot....Lincoln	2	2050	4 x5¼	34x4	34x6	W
Patriot....LS-800	2	2175	4 x5¼			
Patriot..Washgt'n	3	2900	4½x5¼	36x5	36x7	W
Pierce-Arrow.....	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow.....	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow.....	5	4850	4½x6¾	36x5	40x6d	W
Pittsburgher.....	1½–2	3000	3⅝x5	36x4	36x6	
Pittsburgher.....	3	3800	4½x5¼	36x5k	36x7	W
Power.....F	2	3150	4 x5¼	36x5	36x7	W
Power.....C	3½	....	4½x5½	36x5	40x10	W
Premocar...B-143	1½	2475	3½x5	36x6n	36x6n	W
*Rainier....R-21	¾	....	3½x5	35x5n	35x5n	W
Rainier.....R-29	1	....	3¾x5	34x3½	34x4	W
Rainier.....R-26	1½	....	3¾x5	34x3½	34x5	W
Rainier.....R-28	2	....	4½x5¼	34x4	34x6	W
Rainier.....R-20	2½–3	....	4½x5¼	34x4	34x7	W
Rainier.....R-15	3½–5	....	4½x5½	36x5	36x5d	W
Rainier.....R-25	3½–5	....	4½x5¼	36x5	36x5d	W
Rainier.....R-17	5–6	....	4¾x6	36x6	40x6d	W
Rainier.....R-27	6	....	4¾x6	36x6	40x6d	W
Ranger..TK-20-2	1½	1450	3¾x5	36x6n	38x7n	W
*Reo.....F	¾–1½	1185	4½x4½	34x4½n	34x4½n	B
Reliance.....10A	1½	2400	4 x5⅛	36x3½	36x5	I
Reliance.....20B	2½	3100	4½x5½	36x4	36x4d	I
Republic.....75	¾	1395b	3½x5	32x4½n	32x4½n	I
Republic.....10	1	1395	3¾x5	34x3	34x4	I
Republic...10 Exp	1	1695	3¾x5	34x5n	34x5n	I
Republic.....11X	1½	1795	3¾x5	34x4	34x6	I
Republic.....19	2½	2195	4½x5¼	36x4	36x7	I
Republic.....20	3½	3095	4½x5½	36x5	36x10	I
Rowe.....CW	1½	3000	3¾x5	36x6n	36x6n	W
Rowe.....C.D.W.	2	3300	4 x5	34x4	36x3½d	W
Rowe.....G.S.W.	3	4150	4 x6	34x5	36x5d	W
Rowe.....G.P.W.	3	5250	3¼x5r	38x7n	42x9n	W
Rowe.....HW	4	4500	4¼x6	36x5	36x6d	W
Rowe.....F.W.	5	4850	4½x6	36x6	40x6d	W
Ruggles.....20	1	1195	3¾x5	34x5n	34x5n	B
Ruggles.....40	2	1795	4 x5	34x5n	34x7	D
Samson.....15	¾	....	4–3½x4	32x4n	32x4n	B
Samson.....25	1¼	....	4–3½x5½	35x5n	35x5n	B
Sanford....W-15	1½–2	2150b	3¾x5	36x3½k	36x5k	
Sanford.....25	2½–3½	....	4½x5¼	36x4	36x4d	W
Sanford.....35	3½–5	....	4½x5½	36x5	36x5d	W
Sanford.....50	5–7	....	4¾x6	36x5	40x6d	W
Schacht....2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht....3-Ton	3	3800	4¼x5½	36x5	36x5d	W
Schacht....4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht....5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht....7-Ton	7	5050	4½x6	36x6	40x7d	W
Schwartz.....A	1	1685	3½x5	34x4½n	34x4½n	B
Schwartz.....K	2	3000	3¾x5¼	34x3½	34x7	W
Schwartz.....L	3	3600	4¼x5½	36x4	36x8	W
Schwartz.....M	5	4900	4½x6	36x6	40x12	W
Selden.....30	1½–2½	2250	3¾x5	34x3½	34x5	W
Selden.....31	1½–2½	3350	4½x5¼	34x5n	38x7n	W
Selden.....50	2½–3½	3250	4½x5¼	36x4	36x7	W
Selden.....51	2½–3½	4350	4½x5½	36x6n	40x8n	W
Selden.....70	3½–5	$3750	4½x5½	36x5	36x10	W
Selden.....90	5–7	4950	4¾x6	36x6	40x12	W
Seneca.....M	1½	820	3½x4½	30x3½n	30x3½n	B
*Service.....12	¾	....	3¼x4½	32x4½n	32x4½n	B
*Service.....25	1¼	....	3¾x5½	34x5n	34x5n	B
Service.....21	1½	....	3½x5½	34x3½	34x5	W
Service.....32	2	....	4 x5½	36x3½	36x7	W
Service.....37	2	....	4¼x5½	35x5n	38x7n	W
Service.....52	3	....	4¼x5½	36x4	36x8	W
Service.....72	3½	....	4¼x5½	36x5	36x5d	W
Service.....77	4	....	4½x6	36x5	36x5d	W
Service.....102	6	....	4½x6	36x6	40x6d	W
Signal.....NF	1	1450	3¾x5	34x5n	36x6n	W
Signal.....H	1½	1950	4½x5¼	34x4	36x6	W
Signal.....J	2½	2375	4½x5¼	34x4	36x8	W
Signal.....M	3½	3175	4½x5½	36x5	40x5d	W
Signal.....R	5	3900	4¾x6	36x6	40x6d	W
*Standard.....75	1¼	1330	3¾x5	33x5n	33x5n	W
Standard.....1-K	1½	1600	3¾x5	34x3½k	34x5k	W
Standard.....76	2½–3	2400	4½x5¼	36x4k	36x8	W
Standard.....66	3½–5	3150	4½x5½	36x5	36x12	W
Standard.....5-K	5–7	4400	4¾x6	36x6	40x14	W
*Star.....	½	610b	3½x4½	30x3½n	30x3½n	
Sterling.....1½	1½	2885	4 x5¾	36x3½k	36x5k	W
Sterling.....2	2	3085	4 x5¾	36x4k	36x6k	W
Sterling.....2½	2½	3290	4¾x5¾	36x4k	36x4dk	W
Sterling.....3½	3½	4325	4½x6¼	36x5k	40x5dk	W
Sterling.....5-W	5	4950	5 x6¼	36x6	40x6d	W
Sterling.....5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling.....7½	7½	6000	5 x6¼	36x6	40x7d	C
*Stewart...Utility	¼–1½	1245	3⅝x5⅛	34x4½n	34x4½n	I
Stewart.....15	1½–1½	1445	3⅝x5⅛	35x5n	35x5n	I
Stewart.....9	1½–2	1790	3¾x5	34x3½	34x6	I
Stewart.....7-X	2½–3	2390	4½x5½	34x4	34x8	I
Stewart.....10-X	3½–4	3190	4½x6	36x5	36x10	I
*Stewart.....	1¼	1245	4–3½x5½	34x4½	34x4½	
*Stoughton.....C	¾	1095	3½x5	34x4½n	34x4½n	B
Stoughton.....A	1	1790	3¾x5¼	34x5n	34x5n	W
Stoughton.....B	1½	2150	3¾x5¼	36x3½	36x5	W
Stoughton.....D	2	2490	4 x5½	36x4	36x7	W
Stoughton.....F	3	3150	4¼x5½	36x5d	36x5d	W
Sullivan.....E	2	2800	4¼x5½	36x4k	36x7k	W
Sullivan.....H	3½	3750	4½x6	36x5	36x5d	W
*Thomart.....	1¼	1795	4 x5¼	34x5	34x5	C
Tiffin.....GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin.....MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin.....PW	3½	3600a	4½x5½	36x5	40x5d	W
Tiffin.....PW	5	4300	4¾x6	36x6	40x6d	W
Tiffin.....UW	6	4500	4¾x6	36x6	40x12	W
Titan.....	2	2750	4 x5	36x4k	36x7k	D
Titan.....	2½	2950	4¼x5½	36x4k	36x8k	D
Titan.....	3½	3950	4½x6	36x5k	40x10k	D
Titan.....	5	4550	4½x6	36x5	40x12	D
Tower.....J	1½	2000	4½x5¼	35x5n	38x7n	W
Tower.....H	2½	2475	4½x5¼	36x4	36x7	W
Tower.....G	3½	3475	4½x5½	36x5	36x5d	W
Traffic.....	1½	1595a	3¾x5	35x5n	35x5n	I
Traffic.....C	2	1595a	3¾x5	34x3½k	34x5k	I
Traffic.....	3	1895a	3¾x5	36x4	36x7	I
*Transport.....15	1	1295	3¾x5	32x4½n	32x4½n	B
Transport.....25	1½	1495	3¾x5½	34x3½k	34x5k	I
Transport.....35	2	1885a	3¾x5	36x3½k	36x6k	I
Transport.....55	3	2385	4½x5¼	36x4k	36x8k	I
Transport.....60	3½	2585	4½x5½	36x4k	36x8k	I
Transport.....75	5	3485	4½x6	36x5k	36x12k	I
Traylor.....B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor.....C	2–2½	2850	4 x5½	36x4	36x7	W
Traylor.....D	3–3½	3300	4½x5½	36x4	36x8k	W
Traylor.....F	5–6	4700	4½x6	36x6	40x6d	W
*Triangle.....AA	1	1285	3½x5	31x4½n	34x4½n	I
Triangle.....A	1½–2	1985	3¾x5¼	31x3½k	34x6k	I
Triangle.....C	2–2½	2285	3¾x5¼	36x4k	36x7k	I
Triangle.....B	2½–3	2585	4 x5¾	36x4k	36x7k	I
Twin City..B.W.	2	2400	4 x5½	36x6	40x8	I
Twin City..A.W.	3½	3500	4½x6	36x5	40x5d	W
[5]Twin City.....B	3½	....	5½x6	36x6	36x6	I
[5]Twin City.....A	5	....	5½x6	36x7	36x7	I
Ultimate.....A	2	3150	4 x5½	36x3½	36x6	W
Ultimate.....AJ	2	3200	4½x5½	36x3½	36x6	W
Ultimate.....AJL	2	3250	4½x5½	36x3½	36x6	W
Ultimate.....B	3	3700	4½x5½	36x4	36x4d	W
Ultimate.....BL	3	3800	4½x5½	36x4	36x4d	W
Ultimate.....D	5	5500	5 x6½	36x6	40x12	W
United.....A	1½	2445	3¾x5¼	36x3½k	34x5k	W
United.....B	2½	3150	4½x5½	36x4k	36x7k	W
United.....C	3½	3975	4½x5½	36x5	36x5d	W
United.....V	5	4530	4½x6	36x6	40x6d	W
*United States..U	1¼	1800	3⅝x5⅛	31x5n	34x5n	B
UnitedStates..NW	1½–2	2375	3¾x5	35x5	36x3½	W
United States...N	1½–2	2175	3¾x5	36x3½k	36x5k	I
United States...R	3	3300	4 x5¼	35x4	36x4d	W
United States...S	4	4075	4½x5½	36x5	36x5d	W
United States...T	5–7	4975	4¾x6½	36x6	40x6d	W
Velie.....46	1½	1585	3¾x5	36x3½k	36x5k	I
Velie.....53	2½	2185	4 x5½	36x4k	36x7k	I
Veteran.....M**	1½	2690	3¾x5½	35x5n	35x5n	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

3—Moreland Road Runner. 4—Nelson Le Moon. 5—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Veteran.....P**	2	$3699	4¼x5½	36x4	36x7	W
Veteran.....R**	3	4200	4¼x5½	36x4	36x7	W
Veteran.....S**	4	5395	4½x6	36x5	36x10	W
*Vim.....50	½–¾	995	4 x5	32x4n	32x4n	B
Walker-JohnsonA	2	2500	3¾x5	34x3½	34x6	W
Walker-JohnsonB	3	3000	4¼x5½	36x4	36x8	W
Walter.....M	2½	3850	4½x5¾	36x4	36x8	D
Walter.....S	5	4850	4½x6¼	36x6	40x6d	W
*Watson.....C	1	1465a	3⅝x5½	35x5n	35x5n	W
Watson.....N	3½	4250	4½x5½	36x5	36x10	W
Western....W1½	1½	2450	4½x5¼	36x3½k	36x5k	W
Western....L1½	1½	2450	3¾x5	36x3½k	36x5k	W
Western....W2½	2½	3250	4½x5¼	36x4	36x7	W
Western....L2½	2½	2450	4¼x6	36x4	36x7	W
Western....W3½	3½	4000	4½x6	36x5	40x5d	W
*White.....15	¾	2400	3¾x5½	34x5n	34x5n	B
White.....20	2	3250	3¾x5½	36x4k	36x7k	D
White.....40	3½	$4200	3¾x5¼	36x5	40x5d	D
White.....45	5	4500	4¼x5¼	36x6	40x6d	D
White Hick....E	1	1225	3 1x5n	34x5n		W
White Hick....H	1½	1375	3¾x5	36x3½	36x5	W
White Hick....K	2½	1675	4⅛x5¼	36x4	36x5	W
Wichita.....K	1	1875	3¾x5¼	36x3½	36x4k	W
Wichita.....M	2	2400	3¾x5¼	36x3½k	36x6k	W
Wichita.....RX	3	3200	4⅝x5¾	36x4k	36x8k	W
Wichita.....O	4	$3500	4½x6¼	36x5k	36x5k	W
Wilcox.....AA	1	1900	3¾x5½	36x4k	36x4k	W
Wilcox.....BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox.....D	2½	3000	4¼x5	36x4k	36x3½dk	W
Wilcox.....E	3½	3950	4½x6	36x5k	36x5dk	W
Wilcox.....F	5	4350	4¾x6½	36x5	40x6d	W
Wilson.....F	1½	2270	3¾x5	36x3½	36x5	W
Wilson.....EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson.....G	3½	3685	4½x5½	36x5	36x5	W
Wilson.....H	5	4520	4¾x6	36x6	40x6	W
*Wisconsin.....A	1	1750	3¾x5	34x5n	34x5n	W,B
Wisconsin.....B	1½	2100	3¾x5	35x5	36x6	W
Wisconsin.....C	2½	2700	4 x5¾	36x6n	36x7	W
Wisconsin.....D	3½	3000	4¾x5¾	36x6n	40x8	W
Wisconsin.....E	5	3500	4½x6¼	36x6	36x10	W
Wisconsin.....F	7	4000	5 x6¼	36x6	36x12	W
Witt-Will.....N	1½	2450	3¾x5	36x3½k	36x6k	W
Witt-Will.....P	2½	2900	4½x5¼	36x4k	36x8k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.

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Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P.	6–12	$250	2	LeR.	4-3½x4½	Gas.	1
Allis-Chalm..	15–25	1185	4	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm...	20–35	1885	4	Own	4-4¾x6½	GorK	3-4
‡Allis-Chalm..	20–35	2085	4	Own	4-4¾x6½	G	4
Allwork...2-G	14–28	1595	4	Own	4-4¾x6	GorK	3
Allwork.....C	14–28	1395	4	Own	4-5 x6	GorK	3
¶ARO.1921-22	3–6	385	4	Own	1-4½x5	Gas.	1
Aultman-T,...	15–30	1900	4	Clim.	4-5 x6½	G,K,D	4
Aultman-T,...	22–45	2800	4	Own	4-5½x8	G,K,D	6
Aultman-T,...	30–60	4000	4	Own	4-7 x9	G,K,D	8–10
Automot...B-3	12–24	1250	4	Herc.	4-4 x5⅛	Gas.	2-3
Avery,SR.Cul.	5–10	....	4	Own	4-3 x4	G,K	..
Avery Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5–10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8–16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12–20	....	4	Own	4-4⅜x6	G,K,D	2-3
§Avery.....	....	....	*	Own	4-4x5½	G,K,D	3-4
Avery.....	12–25	....	4	Own	2-6½x7	G,K,D	2-3
Avery.....	14–28	....	4	Own	4-4⅞x7	G,K,D	3-4
Avery.....	18–36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25–50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45–65	....	4	Own	4-7¾x8	G,K,D	8–10
Bates Mule..H	15–25	....	4	Midw.	4-4½x5¼	Gas.	3
Bates Mule..F	18–25	....	*2	Midw.	4-4½x5¼	Gas.	3
‡BatesMule.G	25–35	....	*2	Midw.	4-4½x6	Gas.	..
Bear.....	25–35	4250	*2	Ste.	4-4¾x6½	Gas.	4
¶Beeman Jr...	¼–1½	180	2	B&S	1-2½x2½	Gas.	..
¶Beeman...G	2–4	240	4	Own	1-3½x4½	Gas.	..
Best.....	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	....	*2	Own	4-6½x8½	G,K,D	8-9
¶Bolens.....	....	....	4	B&S	1-2½x2½	G.	..
Boring.....	5–10	395	4	LeR.	4-3½x4½	G.	..
Boring...1921	....	1850	3	Wauk	4-4½x5¾	GorK	2
**Bryan.....	15–30	....	4	Own	2-4 x5	K.	3
Case.....	12–20	1050	4	Own	4-4½x5	G,K,D	2-3
Case.....	15–27	1320	4	Own	4-4½x6	G,K,D	3--
Case.....	22–40	2550	4	Own	4-5½x6¾	G,K,D	4-5
Case.....	40–72	5200	4	Own	7 x8	G,K,D	8–10
Caterpillar T35	15	....	*2	Own	4-4 x5½	Gas.	3
Caterpillar..5T	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar 10T	40	....	*2	Own	4-6½x7	Gas.	6
Centaur.....	5–2½	345	2	√Way	2-4½x4½	GorK	1
Cletrac.....F	9–16	595	*2	Own	4-3¼x4½	G,K,D	2
Cletrac.....W	12–20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15–27	1500	3	Dom,	4-4¾x6	Gas.	3
De-It-All,Baby	1	237	..	Own	1-2¾x2¾	Gas.	1
De-It-All....A	3–6	495	..	Own	1-4½x5	Gas.	1
De-It-All, Jack	6	395	..	Own	1-3⅝x3	Gas.	1
De-It-All....6	12	495	2	Own	2-3⅝x3½	Gas.	1
Eagle.....F	12–22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....H	16–30	....	4	Own	2-8 x8	GorK	4-5
E-B.....AA	12–20	1095	4	Own	4-4¾x5	G,K,D	3
Fageol.....D	9–18	1175	4	Lyc.	4-3½x5	Gas.	2
Farm Horse..B	18–30	1885	4	Clim	4-5 x6½	G,K	4
Fitch..4 Drive	20–35	1850	4	Clim.	4-5 x6½	GorK	3-4
Fordson.....	–18	395	4	Own	4-4 x5	G,K	2
Frick.....A	12–20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15–28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt...A	18–36	$2150	4	Wauk.	4-4¾x6¾	GorK	4
Gray.....	20–36	1975	3	Wauk.	4-4½x6¼	Gas.	4
Gray.....	22–44	2165	3	Wauk.	4-5 x6¼	Gas.	4-5
Gt. WesternSt	20–30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	865	4	Own	2-5¼x6½	K,D.	2
Hart-Parr...30	30	1045	4	Own	2-6½x7	K,D.	3
‡Hart-Parr....	....	1395	4	Own	6½x7	K,D.	..
Heider.....D	9–16	628	4	Wauk.	4-4¼x5¾	G,K	2
Heider.....C	12–20	725	4	Wauk.	4-4½x6¾	G,K.	3
Heider...Cult	5–10	800	4	LeR.	4-3½x4½	Gas.	1
Huber Light..4	12–25	985	4	Wauk.	4-4½x5¾	GorK	3
Huber Super 4	15–30	1885	4	Midw.	4-4½x6	Gas.	3
Indiana.....F	5–10	665	2	LeR.	4-3½x4½	Gas.	1-2
International..	8–16	†670	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan	10–20	†700	4	Own	2-6½x8	G,K,D	3
International..	15–30	1750	4	Own	4-5¼x8	G,K,D	4
¶Kinkade....	1½–3	190	1	Own	1-3 x3	Gas.	..
La Crosse....	12–24	985	2	Own	2-6 x7	G,K	3
Lauson.....5	12–25	1295	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....21	15–30	1675	4	Beav.	4-4¾x6	GorK	3-4
‡Lauson Road	15–30	2000	4	Beav.	4-4¾x6	K	..
Leader.....B	12–18	685	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16–32	1725	4	Clim.	4-5 x6½	G,K.	3-4
‡Leader...GU	18–35	2150	*2	Clim.	4-5 x6½	G,K	3-4
Little Giant..B	16–22	2200	4	Own	4-4½x5	K	4
Little Giant..A	26–35	3300	4	Own	4-5½x6	K	6
Lombard.1922	85–150	8950	*2	Wisc.	6-5½x6¾	Gas.	15
Lombard.1922	50	5300	*2	Wisc.	4-4¾x6½	Gas.	6–10
MerryGar1922	2	210	2	Evin	1-2⅝x2½	Gas.	..
Minne...All-P	12–25	800	4	Own	4-4½x7	GorK	3
Minne..Gen.P	17–30	1600	4	Own	4-4¾x7	GorK	3-4
Minne.Med.D	22–4	2650	4	Own	4-6 x7	GorK	5-6
MinneHeavyD	35–70	3850	4	Own	4-7¼x9	GorK	8-9
Mohawk.1922	8–1	650	2	Light	4-3¼x4½	KorG	1-2
Moline Univ D	9–18	650	2	Own	4-3½x5	Gas.	2-3
Moline Orch..	9–18	....	2	Own	4-3½x5	Gas.	2-3
‡Monarch....	20–30	3500	*2	Beav.	4-4¾x6	G,K,D	4
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
NB.....1	3–6	375	4	Own	2-3¾x4	Gas.	1
Nichols-Shep..	20–42	2650	4	Own	2-8 x10	GorK	3-6
Nichols-Shep..	25–50	3000	4	Own	2-9 x12	GorK	4-8
Nichols-Shep..	35–70	3650	4	Own	2-10½x14	GorK	8-12
Nilson Senior.	20–40	1975	5	Wauk.	4-5 x6¼	G,K	4
OilPull.....K	12–20	....	4	Own	2-6 x8	K,D	3
OilPull.....H	16–30	....	4	Own	2-7 x8½	K,D	4
OilPull.....G	20–40	....	4	Own	2-8 x10	K,D	5-6
OilPull.....E	30–60	....	4	Own	2-10x12	K,D	8-10
¶Oldsmar...K	2½–5	$225	4	Own	1-5½x5½	Gas.	1
Pioneer.....G	18–36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	40–75	....	4	Own	4-7 x8	Gas.	10
Russell.....	12–24	1500	4	Own	4-4¼x5¾	GorK	2-3
Russell.....	15–30	2200	4	Own	4-5x6½	GorK	3-4
Russell.....	20–35	3000	4	Own	4-5½x7	GorK	4-5
Russell.....	30–60	5000	4	Own	4-8 x10	GorK	8-10
Samson....M	....	445	4	Own	4-4 x5½	G,K	2
Toro Cultivator	6	750	3	LeR.	4-3½x4½	Gas.	2
ToroTractor'22	6–10	495	3	LeR.	4-3½x4½	Gas.	2
Townsend.....	10–20	800	2	Own	4-6½x7	Ker.	2-3
Townsend.....	15–30	1350	2	Own	4-7 x8	Ker.	3-4
Townsend.....	25–50	2500	2	Own	4-8½x10	Ker.	4-8
TractionMotor	40–50	....	4	....	3-3½x5	Gas.	4-5
Traylor....TB	6–12	500	4	LeR.	4-3½x4½	Gas.	1-2
Trundaar....10	25–40	3750	*2	Wauk.	4-5 x6¼	GorK	4
TwinCity.....	12–20	1200	4	Own	4-4¼x6	H,K	3
Twin City.....	20–35	2750	4	Own	4-5½x6¾	G,K	5-6
Twin City.....	40–65	4750	4	Own	4-7¾x9	G,K	8-10
Uncle SamC20	12–20	1295	4	Weid.	4-4 x5½	G	2-3
Uncle SamB19	20–30	1985	4	Beav.	4-4¾x6	GorK	3-4
Uncle SamD21	20–30	1895	4	Beav.	4-4¾x6	GorK	3-4
Utilitor....501	2½–4	295	4	Own	1-3½x4½	G	1
Utilitor...501A	2½–4	340	4	Own	1-3½x4½	G	1
Wallis.....K	15–25	....	4	Own	4-4¼x5¾	G,K	3
Waterloo....N	12–25	675	4	Own	2-6½x7	Ker.	3
Wetmore21-22	12–25	1185	4	Wauk.	4-4 x5¾	G,K	3
Whitney....D	9–18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15–30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin..E	16–30	1850	4	Clim.	4-5 x6½	GorK	3
Wisconsin...F	20–40	2050	4	Wauk.	4-5 x6¼	GorK	4
Wisconsin...H	22–40	2550	4	Clim.	4-5½x7	GorK	4-6
Yuba....12-20	12–20	2400	*2	Wauk.	4-4½x6¾	G,K,D	3
Yuba....15-25	15–25	2750	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....20-35	20–35	3900	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25–40	4250	*2	Wisc.	4-5¼x7	G,K,D	..
‡Yuba.....	25–40	4750	*2	Yuba	4-5¼x7	D	..

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. §Track Runner. ‡Industrial Tractor. ¶Garden Tractor. **Steam Tractor.

Specifications of Current Passenger Car Models

PRICES 2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carbureter	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universals: Type and Make	Rear Axle Type and Make	†Gear Ratios
.....	$4500e	$4500	.....	.....	$6500	136	33x5	Cont..	6-3⅝x5¼	31.54	Ambassador.....R	Strom...	West.....	Bosch....	m-d B-L....	B-L.....	f Norwalk..	F Tim..	4.45
$1995c	1785	1850	$1885c	.....	2485	127	33x4½	H-S..	6-3½x5	29.40	American.....D-66	Strom...	G-D.....	A-K.....	s-p B&B....	B & B .	m Hartford..	F Salis..	4.50
.....	1650	.....	.....	.....	.....	127	33x4	Own..	2-	.....	American.....Steamer	None....	L-N.....	L-N.....	None.....	None....	.....	Own..	1.75
.....	1195	.....	.....	$1450c	.....	114	32x4	Cont..	6-3½x4¼	23.44	Anderson...Aluminum 6	.....	West.....	West.....	s-p B&B....	.....	.....	Salis..	.....
{1495 {1785p	1495	1595	{1595c {1945c	1995c	1995d	120	33x4	Cont..	6-3⅜x4½	27.34	Anderson.....Series 40	Rayfield.	Remy.....	Remy.....	s-p B&B....	Durston.	f Snead.....	¾F Salis..	4.50
.....	2620	2645	.....	3625	3695	130	34x4½	Own..	8-3¼x5	33.80	Apperson.....8-21-S	Johnson	Bijur.....	Remy.....	m-d Own....	Own....	m Sterling..	½F Own..	4.25
1575	1475	1545n	{1895n {1995n	2275	2345	121	32x4	Cont..	6-3⅜x4½	27.34	Auburn.....6-51	Strom...	Remy.....	Remy.....	s-p B&B....	G-L.....	m Universal..	F Salis..	4.75
.....	1395	.....	.....	.....	1850d	118	32x4	Cont..	6-3½x4¼	23.44	Barley.....	.....	Delco.....	Delco.....	s-p B&B....	Fuller...	f M&E.....	Col..	.....
1800	1800	.....	.....	2400	2500	121	32x4	Cont..	6-3¼x4½	25.35	Bay State.....	Strom...	Delco.....	Delco.....	s-p B&B....	Warner.	m Spicer....	¾F Col..	4.67
2950	2950c	.....	.....	3950	3950	121	32x4	Buda.	4-3⅜x5⅛	22.50	Biddle.....B1 & B5	Zenith...	G-D.....	Simms....	s-p Warner .	Warner..	m Spicer....	½F Std..	4.50
5000	5000	.....	.....	.....	7000	125	32x4½	Own..	4-4 x5½	25.60	Brewster.....91	Zenith...	USL.....	Bosch....	c Own....	Own....	F Own.....	F Own..	3.92
865	885	725g	.....	1175	{1395 {1325	109	31x4	Own..	4-3⅜x4¾	18.23	Buick..1923-34-5-6-7-38	Marvel..	Delco.....	Delco.....	m-d Own....	Own....	m Own.....	¾F Own..	4.66
1175	1195	975g	.....	1935	1985	118	33x4	Own..	6-3⅜x4½	27.34	Buick....1923-41-4-5-47	Marvel..	Delco.....	Delco.....	m-d Own....	Own....	m Own.....	¾F Own..	4.60
.....	.....	1435	{1625a {1675c	1895	2195	124	34x4½	Own..	6-3⅜x4½	27.34	Buick.1923-48-9-50-4-55	Marvel..	Delco.....	Delco.....	m-d Own....	Own....	m Own.....	¾F Own..	4.90
3100	3150	3150	.....	{3875a {3925d	4100	132	33x5	Own..	8-3½x5⅛	31.25	Cadillac.....61	Own....	Delco.....	Delco.....	m-d Own....	Own....	m Spicer....	F Tim..	4.50
1750	1790	.....	.....	2480	2575	122	32x4½	Cont..	6-3⅜x4½	27.34	Case.....X	Rayfield.	Delco.....	Delco.....	m-d Own....	Own....	f Snead....	½F Col..	5.25
.....	1390	2250	1950	2480	2975	129	34x4½	Cont..	6-3⅝x5¼	31.54	Case.....W	Rayfield.	Delco.....	Delco.....	m-d Own....	Own....	f Arvac.....	¾F Col..	4.45
1185	1185	.....	.....	1595	{2295 {1585	117	32x4	Own..	6-3¼x4½	25.35	Chalmers.....1922	Strom...	A-L.....	Remy.....	m-d Own....	Own....	m Hardy.....	½F Adams	5.13
.....	.....	1345	.....	.....	.....	122	32x4	Own..	6-3¼x4½	25.35	Chalmers.....1922	Strom...	A-L.....	Remy.....	m-d Own....	Own....	m Hardy.....	½F Adams	5.13
1495	1495c	1645	1595a	1995c	{2295d {2375f	123	33x4	Own..	6-3½x5	29.40	Chandler.....Six	Rayfield.	Bosch.....	Bosch.....	s-p B&B....	Own....	f Own.....	F Own..	4.45
510	525	425g	.....	{ 840c {680k	860	102	30x3½	Own..	4-3⅛x4	21.53	Chevrolet.....Superior	Zenith . } Holley . }	A-L.....	Remy.... } A-L..... }	c Own....	Own....	m Own.....	½F Own..	3.66
1085	995	.....	1260	1295d	1495	112	32x4	Own..	6-3⅛x4½	22.50	Cleveland.....41	Strom...	Bosch.....	Bosch.....	s-p Own....	Own....	m Mech.....	¾F Own..	4.45
2685	.....	2685	2685c	3285b	{3285c {3685 f	127¼	33x5	Nort..	8-3½x4½	39.20	Cole.....890	Johnson	Delco.....	Delco.....	c North..	North..	m Spicer....	F Col..	4.46
1475	1475	.....	1475c	1925c	1995d	115	32x4	Cont..	6-3⅜x4½	27.34	Columbia.....Elite	Strom...	A-L.....	A-K.....	s-p B&B....	Durston.	m Spicer....	¾F Tim..	.....
995	985	.....	.....	.....	1395d	115	31x4	Cont..	6-3½x4¼	23.44	Columbia.....Light Six	Strom...	A-L.....	A-L.....	s-p B&B....	Durston.	m Spicer....	¾F Tim..	.....
1395	1395	.....	{1495b {1495c	2065b	2165d	116	32x4	Falls.	6-3½x4¼	23.44	Courier.....	Till.....	Bijur.....	A-K.....	s-p B&B....	Muncie.	f Norwalk..	¾F Col..	5.00
3000	3000	3000	.....	.....	4500	122½	32x4	Cont..	6-3⅝x5¼	31.54	Crawford.....22-6-60	Strom...	West.....	Bosch....	m-d B-L....	B-L.....	Spicer.....	½F Tim..	.....
.....	.....	.....	3500	.....	.....	135	33x5	Cont..	6-3⅝x5¼	31.54	Crawford-Dagmar...6-60	Zenith...	West.....	Bosch....	m-d B-L....	B-L.....	Spicer.....	½F Tim..	.....
.....	.....	.....	.....	.....	.....	142	33x5	Own..	8-3¾x5	45.01	Cunningham.....V	Strom...	Delco.....	Delco.....	m-d Own....	Own....	f Snead.....	F Tim..	4.23
4350b	4350c	4350	.....	5250	6000	132	33x5	Own..	8-3½x5¼	39.20	Daniels.....D-19	Zenith...	Delco.....	Delco.....	m-d Own....	Own....	m Spicer....	F Tim..	4.50
.....	1195	.....	1495	1795	1795	114	31x4	Cont..	6-3½x4¼	23.44	Davis.....71	Strom...	Delco.....	Delco.....	s-p B&B....	Warner.	m Peters....	½F Tim..	5.10
1595	1595	.....	1695	2095	.....	120	32x4	Cont..	6-3⅜x4½	27.34	Davis.....61-67	Strom...	Delco.....	Delco.....	s-p B&B....	Warner.	m Peters....	¾F Tim..	5.15
1175	1175	1295c	1245	1545	1595	112	32x4	H-S..	4-3½x5	19.60	Dixie Flyer.....H-S-70	Strom...	Dyneto...	Eisemann..	s-p B&B....	G-L.....	f Hardy.....	F Peru..	4.75
850	880	.....	.....	980h	1195d	114	32x4	Own..	4-3⅞x4½	24.03	Dodge Brothers.....	Stewart..	N.E.....	N.E.....	m-d Own....	Own....	m Own.....	½F Own..	4.16
3350	3950e	3950	.....	4985c	5750f	132	33x5	Own..	6-4 x5	38.40	Dorris.....6-80	Strom...	West.....	Bosch....	m-d Own....	Warner.	m Spicer....	F Tim..	4.23
865	865	.....	{1015a {1015d	{1240 {1020k	{1370 {1070k	108	31x4	D-Ly.	4-3½x5	19.60	Dort.....19-14	Carter..	Bosch.....	Conn.....	m-d Detlaff..	Own....	m Mech.....	¾F Flint..	4.66
990	990	.....	.....	{1145 {1365	{1195 {1495	115	31x4	Falls..	6-3⅛x4¼	23.44	Dort.....25-20	Carter..	Bosch.....	Bosch.....	m-d Detlaff..	Own....	Mech.....	¾F Flint..	4.66
1275	1275	.....	.....	1650	1975	104	30x3½	Own..	4-2⅝x4½	11.03	Driggs.....	Zenith..	Bosch.....	Bosch.....	s-p Hoos..	Mech..	m Spicer....	¾F Own..	4.75
6500	6500	6750	.....	7800	7800	134	33x5	Own..	8-2⅞x5	26.45	Duesenberg...Straight 8	Strom...	Delco.....	Delco.....	s-p Own....	Own....	f Own.....	½F Own..	4.81
3000	3200	.....	.....	3800	4000	124	32x4½	Own..	4-3⅛x5½	24.81	Du Pont.....A	Y&T.....	West.....	Eisemann..	m-d B-L....	B-L.....	m Spicer....	Col..	4.50
890	890	.....	.....	1365	1365	109	31x4	Cont..	4-3⅞x4¼	24.03	Durant.....A-22	Till.....	A-L.....	A-L.....	s-p Own....	Own....	m,f Spicer..	¾F Adams	4.30
1600	1650	.....	.....	2250	2400	123½	32x4½	Anst..	6-3¼x4½	25.35	Durant.....B-22	Rayfield.	A-L.....	A-L.....	s-p Ansted..	Warner.	m,f Spicer..	½F Tim..	5.15
1485	1095	950g	.....	1395c	1795	112	32x4	Own..	4-3⅛x5½	18.91	Earl.....40	Scoe....	A-L.....	Conn.....	s-p B&B....	Own....	f Own.....	½F Own..	3.66
1095	1095	.....	1095	1345	.....	118	33x4	Lyc..	4-3½x5	19.60	Elcar.....K-4	Strom...	Delco.....	Delco.....	s-p B&B....	Muncie.	m Peters....	¾F Salis..	4.50
1395	1395	.....	1395	1975	2065	118	33x4	Cont..	6-3⅜x4½	27.34	Elcar.....8-R	Strom...	Delco.....	Delco.....	m-d Warner	Warner..	m Spicer....	¾F Salis..	4.50
1125c	1125	.....	1165	1695	1645	118	33x4	Falls.	6-3½x4¼	23.44	Elgin.....K-1	Strom...	West.....	Wagner..	s-p B&B....	Mech..	m Mech.....	¾F Col..	4.66
.....	1045	.....	.....	1145k	{1895 {1245k	108½	32x4	Own..	4-3⅜x5	18.23	Essex.....	Own....	Bosch.....	Bosch.....	m-d Own....	Own....	m Spicer....	½F Own..	4.66
269r	298s	235g	.....	530	{595 {725	100	30x3½	Own..	4-3¾x4	22.50	Ford.....T	Own....	Own.....	Own.....	m-d Own....	Own....	m Own.....	½F Own..	3.63
3900	3900	.....	.....	4900	4900	132	32x4½	Own..	6-3⅜x5	27.34	Fox.....7F	Zenith...	West.....	Bosch....	m-d B-L....	B-L.....	Spicer.....	½F Tim..	4.45
1900	1950	1750g	.....	2750	2850	115	32x4	Own..	6-3¼x4	25.35	Franklin.....10	Own....	N.E.....	A-K.....	s-p B&B....	Own....	m Spicer....	¾F Own..	4.73
895	895	.....	.....	1095k	1315d	112	32x4	Lyc..	4-3½x5	29.60	Gardner.....T-R & G	Carter..	West.....	West.....	s-p B&B....	Mech..	m Mech.....	¾F Flint..	4.80
1385	1385	.....	.....	1895	1915	116	32x4	Own..	6-3⅛x4½	23.44	Grant.....	Strom...	Bijur.....	A-K.....	s-p B&B....	Durston.	m Spicer....	¾F Col..	4.66
490	490	.....	.....	.....	760	100	30x3½	Own..	4-3⅝x4	21.03	Gray.....	Scoe....	West.....	West.....	m-d Own....	Detroit..	m Mech.....	½F Tim..	3.90
2475	2475c	.....	3250	.....	3475	120	32x4½	Weid..	4-3¾x5½	22.50	H.C.S.....Series 4	Strom...	Delco.....	Delco.....	m-d B-L....	B-L.....	m Spicer....	¾F Own..	.....
.....	.....	2650	.....	3450	3450	125	32x4½	Own..	4-4⅛x4½	27.23	Handley-Knight.....	Till.....	A-L.....	A-L.....	m-d Warner	Warner..	m Spicer....	½F Tim..	4.90
.....	995	.....	.....	.....	.....	114	31x4	Cont..	6-3½x4¼	25.35	Hanson.....30	Marvel..	Delco.....	Delco.....	s-p B&B....	Detroit..	.....	¾F Tim..	.....
1595	1595	1795	.....	2475c	2585	121	32x4	Cont..	6-3⅜x4½	27.34	Hanson.....60	Marvel..	Delco.....	Delco.....	s-p B&B....	Detroit..	.....	¾F Tim..	.....
.....	1345	1345c	.....	1950	1950	115	32x4	H-S..	4-3½x5	19.60	Hatfield.....A-42	Zenith...	Dyneto...	Conn.....	s-p B&B....	G-L.....	m Spicer....	¾F Col..	4.66
2395	2395c	2395	.....	3095d	3395	132	33x5	Own..	6-3½x5 5/16	29.40	Haynes.....75	Strom...	L-N.....	King.....	s-p Warner	Own....	m Universal..	¾F Own..	4.60
{1545 {1895p	1495	.....	{1895a {1895d	{2095b {2135p	{2395d {2695p	121	32x4½	Own..	6-3½x5	29.40	Haynes.....55	Rayfield.	L-N.....	King.....	s-p Warner	Own....	m Universal..	½F Own..	4.11
.....	2500c	2500	.....	3300c	3600f	126	34x4½	Own..	6-3½x4¼	29.40	Holmes.....Series 4	Strom...	Dyneto...	Eisemann..	m-d B-L....	B-L.....	m Spicer....	½F Tim..	4.90
.....	1525c	1575	.....	2570c	{16 5k {2295	126	34x4½	Own..	6-3½x5	29.40	Hudson.....Super 6	Own....	Bosch.....	Bosch.....	m-d Own....	Own....	m Spicer....	½F Own..	4.45
1395	1395	.....	.....	.....	2295	120	32x4	Cont..	6-3⅜x4½	27 34	Huffman.....	Strom...	Dyneto...	Conn.....	s-p B&B....	Covert..	.....	F Salis..	.....
{1150 {1025g	1150	.....	1250a	{1635 {1335k	1785	112	32x4	Own..	4-3¼x5½	16.90	Hupmobile.....Series R	Strom...	West.....	A-K.....	m-d Own....	Own....	m Universal..	¾F Own..	4.87
.....	1485	1685c	.....	2985	2985	121	32x4½	Cont..	6-3¼x4½	25.35	Jackson.....638	Strom...	A-L.....	Remy.....	s-p B&B....	Covert..	f Snead.....	¾F Salis..	4.75
995b	995	.....	1095a	1445c	1465d	112	31x4	Own..	6-3¼x5	25.35	Jewett.....Six	Strom...	Remy.....	A-K.....	m-d Long..	Warner..	m Mech.....	½F Tim..	4.45
1895	1795	.....	.....	2785	2485	120	32x4	Own..	6-3 1/16x4¾	26.38	Jordan.....MX	Strom...	Delco.....	Delco.....	s-p Detroit..	Detroit..	m Spicer....	½F Tim..	4.42
.....	.....	.....	2150c	.....	.....	124	32x4	Own..	6-3 1/16x4¾	26.38	Jordan.....H	Strom...	Delco.....	Delco.....	s-p Detroit..	Detroit..	m Universal..	½F Tim..	4.42
.....	985	.....	.....	.....	1450	111	32x3½	Gray..	4-3½x5	19.60	Kelsey.....4	Scoe....	Bosch.....	Bosch.....	f-d Own....	f-d Own..	.....	Own..	4.50
.....	985	.....	.....	.....	1450	111	32x3½	Gray..	4-3½x5	19.60	Kelsey.....4	Scoe	Bosch.....	Bosch.....	s-p B&B....	Detroit..	Snead.....	½F Std..	4.75
.....	1525	.....	.....	.....	2175	118	32x4	Walk'r	6-3⅛x4½	23.44	Kelsey.....6	Strom...	Bijur.....	Bosch.....	f-d Own....	f-d Own..	.....	Own..	.....
5000	5000	5250	.....	5000	6000	130	32x4½	Own..	8-3 x5¼	28.80	Kenworthy.....8-90	.....	.....	.....	.....	.....	.....	.....	.....
1495	1495	.....	1495c	2200	2400	120	32x4½	Own..	8-3 x5	28.80	King.....K	Ball&B..	West.....	A-K.....	s-p Detroit..	Own....	f Hardy.....	F Col..	4.08
.....	.....	.....	.....	1995	2550f	124	32x4½	Own..	8-3 x5	28.80	King.....K	Ball&B..	West.....	A-K.....	s-p Detroit..	Own....	f Hardy.....	F Col..	4.08
.....	1885	2385	2385c	2975c	3075	124	32x4½	Own..	6-3 1/16x5½	26.38	Kissel.....45	Strom...	Remy.....	Remy.....	m-d Warner	Warner..	m Spicer....	F Own..	3.92
1690	1690	1690	1890	2750	2890	121	33x4	Cont..	6-3⅜x4½	27.34	Kline Kar.....6-55-K	Rayfield.	Wagner...	Conn.....	s-p B&B....	G-L.....	f Snead.....	½F Std..	4.75

MISCELLANEOUS
a—2 Passenger, d—5 Passenger,
b—3 Passenger, e—6 Passenger,
c—4 Passenger, f—7 Passenger,
g—Chassis Price,
h—All Metal Type,
k—Soft Top Type,
n—Tire Size 32x4½,
p—Sport.
r—Price without starter and demountable rims. Price, complete, $364.
s—Price without starter and demountable rims. Price, complete, $393.
†Standard Phaetons.

ENGINE
Anst—Ansted
Cont—Continental
D.-Ly—Dort Lycoming
H-S—Herschell-Spillman
Lyc—Lycoming
Nort—Northway
Walk'r—Walker
Weid—Weidely

CARBURETOR
Ball & B—Ball & Ball
Till—Tillotson
Strom—Stromberg
Y & T—Yale & Towne

CLUTCH
f-d—Friction drive
c—Cone
m-d—Multiple disc
s-p—Single plate
B & B—Borg & Beck
B-L—Brown-Lipe
North—Northway

STARTING, LIGHTING IGNITION
A-L—Auto Lite
G-D—Gray & Davis
L-N—Leece Neville
N. E.—North East
West—Westinghouse

GEARSET
f-d—Friction Drive
B-L—Brown-Lipe
G-L—Grant-Lees
Mech—Mechanics
North—Northway

UNIVERSAL
f—fabric
m—metal
M &E—Merchant & Evans
Mech—Mechanics

REAR AXLE
F—Floating
½F—Semi-Floating
¾F—Three-Quarter Floating
Col—Columbia
Salis—Salisbury
Std—Standard
Tim—Timken

The Coachbilt

ANDERSON

ALUMINUM SIX

The frame is really rigid. Eight cross-supports check the strains that bring old age upon a car.

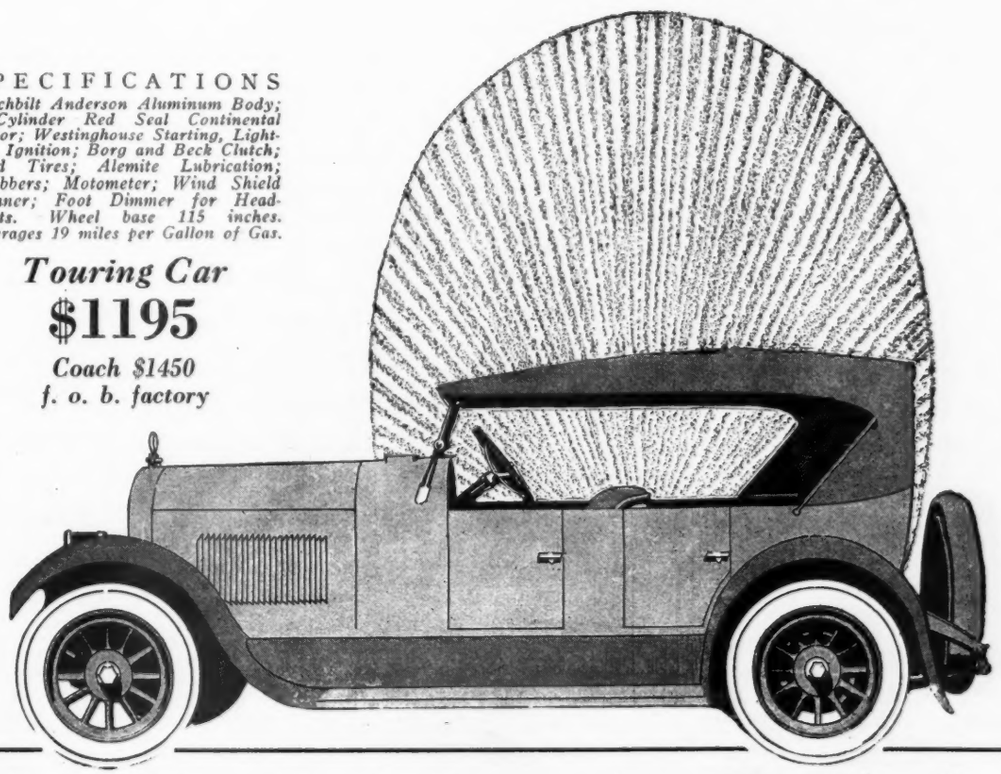
SPECIFICATIONS

Coachbilt Anderson Aluminum Body; 6 Cylinder Red Seal Continental Motor; Westinghouse Starting, Lighting, Ignition; Borg and Beck Clutch; Cord Tires; Alemite Lubrication; Snubbers; Motometer; Wind Shield Cleaner; Foot Dimmer for Headlights. Wheel base 115 inches. Averages 19 miles per Gallon of Gas.

Touring Car

$1195

Coach $1450
f. o. b. factory



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Anderson Motor Co. - Rock Hill, S. C.

Specifications of Current Passenger Car Models

PRICES 2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carbureter	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	†Gear Ratio
$3985	$4090c	$4090	.....	$5500	$5500	132	33x5	Own..	8-3¼x5¼	33.80	LaFayette	Johnson	Delco	Delco	m-d Own	Own	m Own	F Own	4.58
5500	5500	5500	.....	5500	5500	134	32x4½	Own..	6-3⅜x5¼	33.75	Leach 999	Rayfield	Delco	Delco	m-d	Own	m,f	Tim	
1695	1695	1795	$2045d	2345c	2545d	123	32x4½	Anst..	6-3¼x4½	25.35	Lexington 23	Rayfield	G-D	Conn	m-d Ansted	Warner	f Snead	¾F Own	5.10
	1995	2095			2145d														
1575	1395	.....	1575	2085	2245	117	32x4	Own..	6-3⅛x5	23.44	Liberty 10-D	Strom	Wagner	Wagner	s-p B&B	Detroit	m Spicer	½F Tim	4.80
				1695k															
3800	3800c	3800	.....	4400d	4700d	136	33x5	Own..	8-3⅜x5	36.45	Lincoln	Strom	Delco	Delco	m-d Own	Own	m Spicer	F Tim	4.58
6800g	7600c	7600	.....	10500	11000	142	35x5	Own..	6-4½x5½	48.60	Locomobile Series 8	Ball&B	West	Delco	m-d Own	Own	m Own	F Cwn	3.50
3385	3185c	3185	.....	3985	4385	136	32x4½	Own..	6-3¾x5⅛	33.75	Marmon 34	Strom	Delco	Delco	m-d Own	Own	m Spicer	¾F Own	3.75
885	885	.....	.....	985	1335	109	31x4	Own..	4-3⅝x4½	21.03	Maxwell	Stewart	A-L	Simms	c Own	Own	.....	¾F Own	4.55
				1235															
6300	6300c	6300	.....	7500	7500	140	33x5	Own..	6-4½x6	48.60	McFarlan 1922	Rayfield	West	Splitdorf	s-p B&B	B-L	m Peters	F Tim	3.50
3950	3950c	3950c	.....	4850	5250	132	32x4½	Own..	4-3¾x6¾	22.50	Mercer Series 5	Ball&B	West	Eisemann	m-d Own	Own	m Spicer	F Own	3
.....	3750	3750	.....	5000	5000	132	32x4½	Own..	6-3¾x5	33.75	Mercer 6	Strom	.....	Eisemann	.....	.....	.....	¾F	3.77
1895	1895	.....	.....	.....	.....	119	32x4	Cont..	6-3¼x4½	25.35	Merit	Strom	Delco	Delco	s-p B&B	Muncie	f Snead	F Col	4.60
1490b	1590	.....	1850c	2050c	2275d	120	32x4	Own..	6-3½x5	29.40	Mitchell F-50	Strom	Remy	Remy	s-p B&B	Own	m Own	F Own	4.42
.....	.....	1690	.....	.....	.....	127	32x4½	Own..	6-3½x5	29.40	Mitchell F-50	Strom	Remy	Remy	s-p B&B	Own	m Own	F Own	4.42
950	950	.....	.....	.....	.....	115	32x4½	Own..	4-3¼x4½	16.90	Monroe 1922-S-9	Zenith	A-L	Conn	m-d Own	Mech	m Universal	¾F Own	5.30
1295	1195	p1445d	1885c	1585c	1695	115	31x4	Cont..	6-3¼x4½	23.44	Moon 6-40	Strom	Delco	Delco	s-p B&B	Warner	m Spicer	½F Tim	4.80
1785	1785	1785	1885	2785	2785f	128	33x4½	Cont..	6-3⅜x4½	27.34	Moon 6-58	Strom	Delco	Delco	B&B	B-L	m Spicer	½F Tim	5.09
					2485c														
1210	1240	.....	1395c	.....	2040d	121	33x4	Own..	6-3¼x5	25.35	Nash 691-96-97	Marvel	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.50
.....	.....	1390	1645	1890c	2190f	127	34x4½	Own..	6-3½x5	25.35	Nash 692-94-95	Marvel	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.50
915	935	.....	.....	1385b	1545d	112	33x4	Own..	4-3⅜x5	18.23	Nash Four 41-4	Schebler	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.88
				1195k	1275k														
2475b	2475c	2375	.....	3250c	3825f	130	32x4½	Own..	6-3½x5¼	29.40	National BB	Rayfield	West	Delco	s-p B&B	B-L	m Arvac	F Col	4.08
		3150		3725c															
2500	2500c	2600c	.....	.....	3500d	128	32x4½	Cont..	6-3¼x4½	25.35	Noma 3C	Claudel	Delco	Delco	s-p B&B	Detroit	m Spicer	½F Tim	4.45
2500	2500	.....	.....	.....	5500	128	33x5	Bea..	6-3½x5¼	29.40	Noma 1D	Zenith	Delco	Delco	s-p B&B	Detroit	f Spicer	½F Tim	4.45
.....	1035	.....	.....	.....	.....	116	32x3½	Lyc..	4-3½x5	19.60	Norwalk 430-KS	Zenith	Dyneto	Delco	s-p B&B	B-L	m Universal	¾F Col	5.00
975	995	795g	1165c	1445d	1545	115	32x4	Own..	6-2¹¹⁄₁₆x4¾	18.99	Oakland 6-44	Marvel	Remy	Remy	c Own	Muncie	m Mech	F Own	4.33
				1185a															
3750c	3750	3850	3750c	4500c	4800f	134	33x5	Cont..	6-3⅝x5¼	31.54	Ogren 6 T D Luxe	Rayfield	Bosch	Bosch	m-d B-L	B-L	m	F Col	4.00
955	975	1350d	1075	1475	1595	115	32x4	Own..	4-3¼x5¼	21.86	Oldsmobile 43 A	Zenith	A-L	Remy	s-p B&B	Warner	m Own	¾F Own	4.33
1735c	1850a	1735	.....	.....	.....	122	33x4½	Own..	8-2⅞x4¾	26.45	Oldsmobile 46	Ball&B	Delco	Delco	c Own	Warner	m Own	¾F Own	4.93
1625p	1375	.....	1675	1875	2025	115	32x4	Own..	8-2⅞x4½	26.45	Oldsmobile 47	Johnson	Delco	Delco	s-p B&B	Warner	m Spicer	¾F Own	5.10
525	525	.....	425g	795	875	100	30x3½	Own..	4-3⅜x4	18.23	Overland 4	Till	A-L	Conn	s-p B&B	Own	m Own	½F Own	4.50
2485	2185	2250g	.....	3175	3275	126	33x4½	Own..	6-3⅜x5	27.34	Packard Single-Six	Own	A-K	Delco	m-d Own	Own	f Spicer	½F Own	4.30
.....	2350g	2685	.....	.....	3525	133	33x4½	Own..	6-3⅜x5	27.34	Packard Single-Six	Own	A-K	Delco	m-d Own	Own	f Spicer	½F Own	4.66
3850	3850	3850	.....	5240	5400	136	35x5	Own..	12-3x 5	43.20	Packard Twin-Six	Own	Bijur	Delco	m-d Own	Own	m Spicer	½F Own	4.36
1465	1465	1290g	.....	1995	2245	119	32x4	Own..	6-3¼x5	25.35	Paige 6-44	Strom	Remy	A-K	s-p Long	Own	m Universal	¾F Salis	4.75
2195b	.....	2195	2245	3100	3155	131	33x4½	Cont..	6-3¾x5	33.75	Paige 6-66	Rayfield	Remy	A-K	s-p Long	Warner	m Mecn	¾F Tim	4.60
.....	1390	1425	.....	2295	2395	120	32x4½	Cont..	6-3⅜x4½	27.34	Paterson 22-6-52	Strom	Delco	Delco	s-p B&B	Durston	m Hartford	½F Std	4.50
.....	2990c	2990	.....	3300a	3990d	128	33x5	Own..	8-3¼x5	33.80	Peerless 23	Ball&B	Delco	Delco	m-d Own	Own	M Spicer	¾F Tim	4.90
				3400c	4090f														
5250	5250c	5250	.....	6800	6900	138	33x5	Own..	6-4 x5½	33.40	Pierce-Arrow	Own	Delco	Delco	m-d Own	Own	m Spicer	½F Own	3.93
					7000														
2050	2000	2050	.....	2950	3000	126	32x4½	H-S..	6-3¼x5	25.35	Pilot 6-50	Till	Bijur	Conn	s-p B&B	Muncie	m Hartford	¾F Col	4 33
3150	3100c	3250	.....	4300	5100	126¾	32x4½	Own..	6-3⅝x5½	27.31	Premier 6-D	Johnson	Delco	Delco	s-p B&B	Own	m Spicer	¾F	4.58
1095	1095	.....	.....	1750	1825	117	32x4	Falls..	6-3⅛x4¼	23.44	Premocar 6-40-A	Strom	Wagner	Wagner	s-p B&B	Mech	m Spicer	¾F	4.66
.....	1665	.....	.....	2385	2475	116	32x4	Own..	4-3¾x5	22.50	R & V Knight R	Strom	Wagner	Wagner	s-p B&B	B-L	m Spicer	F Salis	4.75
2475	2475c	2475	.....	3015	3105	127	32x4½	Own..	6-3½x4½	29.40	R & V Knight J	Strom	Wagner	Wagner	s-p B&B	B-L	m Spicer	½F Tim	4.90
1595	1645	1485	1745	2355c	2435f	120	33x4	Own..	6-3¾x5	24.34	Reo T6 & U6	Rayfield	N.E	N.E	m-d Own	Own	m,f Own	½F Own	4.70
				1835	1885														
3200	3200	3200	.....	.....	4000	131	32x4½	Dues..	4-4¼x6	28.90	ReVere C	Strom	West	Bosch	m-d B-L	B-L	m Spicer	¾F Std	4.00
	1485	.....	.....	1885	1985	117	32x4	Own..	6-3½x4¾	23.44	Rickenbacker A	Strom	Simms	A-K	c Own	Own	m Universal	¾F Own	
2685	2485c	2685	.....	3585	3585	128	32x4½	Cont..	6-3½x5¼	29.40	Roamer 6-54-E	Strom	Bijur	Bosch	s-p G-L	G-L	f Snead	½F Tim	4.88
3785	3485	3650c	3650c	.....	4650c	128	32x4½	Dues..	4-4¼x6	28.90	Roamer 4-75-E	Strom	Bijur	Splitdorf	m-d B-L	B-L	f Snead	½F Tim	3.77
	10900	.....	.....	.....	.....	143½	35x5	Own..	6-4¼x5½	47.60	Rolls-Royce	Own	Bijur	Bijur	c Own	Own	m Own	F Own	3.25
1195	1195	.....	.....	1795	1795	112	32x4	Own..	4-3½x5	19.60	Saxon 125	Strom	Wagner	Wagner	s-p Detlaff	Covert	m Peters	¾F	4.75
1645	1645	.....	.....	2645	2615	118	33x4	Cont..	6-3¼x4½	25.35	Sayers Six DP	Strom	Delco	Delco	s-p B&B	G-L	m Arvac	½F Std	4.75
875	875	.....	.....	.....	.....	108	30x3½	Lyc..	4-3½x5	19.60	Seneca L-2 & O-2	Zenith	A-L	A-L	s-p B&B	G-L	m Universal	F	4.75
1095	1095	.....	.....	.....	.....	112	31x4	Lyc..	4-3½x5	19.60	Seneca 50 & 51	Zenith	A-L	A-L	s-p B&B	G-L	Detroit	F	4.50
980	980	.....	.....	1685	1685	111	32x4	Supr..	4-3⅜x5	18.23	Sperling A	Zenith	Bijur	Splitdorf	s-p B&B	Warner	m Hartford	¾F Peru	
2150	.....	2395	2395	2750	3200	127	34x4½	Own..	8-3¼x5	33.80	Standard 98	Zenith	West	Splitdorf	s-p B&B	G-L	m Arvac	½F Tim	4.45
2750	2750	2750	2425g	3950c	3985f	130	32x4½	Own..	2-4 x5		Stanley 740	None	Bijur	None	None	None	None	½F Own	1.50
1765	1765	.....	.....	2750	.....	118	33x4	Cont..	6-3¼x4½	25.35	Stanwood Six	Strom	West	A-K	s-p B&B	G-L	m Peters	½F Std	4.50
319r	348s	285g	.....	580	615	102	30x3½	Cont..	4-3¼x4¼	15.63	Star	Till	A-L	A-L	s-p		Spicer	Tim	4.87
2250	2250	2450	.....	3150	3450	125	34x4½	Own..	4-3⅜x5⅝	22.50	Stearns-Knight SKL4	Rayfield	West	A-K	m-d Own	Own	f Climax	½F Own	4.50
2700	2700	2850	.....	3500	3700	130	34x4½	Own..	6-3⅜x5	27.34	Stearns-Knight :6	Rayfield	West	A-K	m-d Own	Own	f Climax	½F Own	4.50
1575	1585c	1625c	.....	2450	2550	122	33x4½	Own..	6-3¼x4½	25.35	Stephens 90	Till	A-L	A-L	s-p B&B	Mech	m Mech	½F Tim	4.90
7250	6900c	6800	6900c	8600	8900c	138	35x5	Own..	6-4¼x5½	47.27	Stevens-Duryea E	Strom	West	Berling	m-d Own	Own	m Own	F Own	3.94
			5600g																
975	975	785g	.....	1225	1550	112	32x4	Own..	6-3¼x4½	23.44	Studebaker Light Six	Strom	Wagner	Wagner	s-p Own	Own	f Thermoid	½F Own	4.55
1250	1275	1275c	1000g	1875	2050	119	32x4	Own..	6-3½x5	29.40	Studebaker Special Six	Strom	Wagner	Wagner	s-p Own	Own	m Spicer	½F Own	4.00
1275c				2375															
1300g	1650	.....	1785	2275	2475	126	33x4½	Own..	6-3⅞x5	36.04	Studebaker Big Six	Ball&B	Wagner	Wagner	s-p Own	Own	m Spicer	½F Own	3.70
2450	2790c	2640e	2670a	3490	4450	130	32x4½	Own..	4-4¾x6	30.63	Stutz KLDH	Strom	Remy	Delco	m-d Warner	Own	m Hartford	½F Own	3.50
	3165c	3015																	
2025	2125	2175c	.....	2650e	2785	118	32x4	Own..	4-3⅜x5½	18.23	Templar A-445	Strom	Bijur	Simms	s-p B&B	Detroit	f Snead	½F Us	4 40
1175	1175	.....	.....	.....	.....	117	33x4	H-S..	4-3½x5	19.60	Tulsa E-1-2-3	Zenith	Dyneto	Conn	s-p B&B	Muncie	m	F Salis	4.50
1275	1275	.....	1305	1795	1795	115	32x4	Own..	6-3½x4½	23.41	Velie 58	Strom	West	A-K	s-p Dooley	Durston	m Thiemer	¾F Own	4.66
.....	1900f	1890	.....	.....	2890	125	32x4½	Cont..	6-3½x5¼	29.40	Westcott D-48	Rayfield	Delco	Delco	s-p B&B	B-L	m Peters	½F Tim	4.45
.....	1690	.....	1890	.....	2690	120	32x4	Cont..	6-3¼x4½	35.35	Westcott B-44	Rayfield	Delco	Delco	s-p B&B	Warner	m Peters	½F Col	4.33
2475	2475	.....	.....	3275	3475	121	32x4½	Own..	8-3¼x4	33.80	Wills Sainte Claire A-68	Zenith	Delco	Delco	m-d Own	Own	m Mech	¾F Own	4.45
1235	1235	1375	.....	1795	1950	118	32x4	Own..	4-3⅝x4½	21.03	Willys-Knight 20	Till	A-L	A-L	m-d Own	Own	f Own	¾F Own	4.44
.....	.....	1435	.....	.....	2195f	124	32x4½	Own..	4-3⅝x4½	21.03	Willys-Knight 27	Till	A-L	A-L	m-d Own	Own	f Own	¾E Own	5.12
3400	.....	3400	3600	4000	4550	132	33x5	Own..	6-3¾x5½	33.75	Winton 40	Rayfield	Delco	Delco	m-d Warner	Warner	f Climax	¾F Tim	4.68

MISCELLANEOUS
a—2 Passenger, d—5 Passenger
b—3 Passenger, e—6 Passenger,
c—4 Passenger, f—7 Passenger
g—Chassis Price,
h—All Metal Type,
k—Soft Top Type,
u—Tire Size 32x4½,
p—Sport.
r—Price without starter and demountable rims. Price, complete, $414.
s—Price without starter and demountable rims. Price, complete, $443.
†Standard Phaetons.

ENGINE
Anst—Ansted
Bea—Beaver
Cont—Continental
Dues—Duesenberg
H-S—Herschell-Spillman
Lyc—Lycoming
Supr—Supreme

CARBURETOR
Ball & B—Ball & Ball
Till—Tillotson
Strom—Stromberg

STARTING, LIGHTING IGNITION
A-L—Auto Lite
G-D—Gray & Davis
L-N—Leece Neville
N. E.—North East
West—Westinghouse

CLUTCH
c—Cone
f-d—Friction drive
m-d—Multiple disc
s-p—Single plate
B & B—Borg & Beck
B-L—Brown-Lipe

GEARSET
f-d—Friction Drive
B-L—Brown-Lipe
G-L—Grant-Lees
Mech—Mechanics

UNIVERSAL
f—fabric
m—metal
M&E—Merchant & Evans
Mech—Mechanics

REAR AXLE
F—Floating
½ Floating—Semi-Floating
¾ F—Three-Quarter Floating
Col—Columbia
Salis—Salisbury
Std—Standard
Tim—Timken

Price Changes: Cadillac—Roadster, 5 and 7 passenger Phaeton, $2885; 5 passenger Coupe, $3750; Sedan, $3950. Haynes 55—5 passenger phaeton, $1695; Sedan, $2595; 5 passenger Sport Phaeton, $1590. Haynes 75—7 passenger Phaeton, $2595; Coupe, $3350; Sedan, $3675.